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No. 4

CODE FOR SERUM-VIRUS INDUSTRY

A code of fair competition for the anti-hog cholera serum and hog cholera virus industry was signed by President Roosevelt on March 6 and became effective and binding on all members of the industry on March 9. Representatives of the producers had been hard at work almost continuously for approximately eight months, in efforts to formulate a code that would be acceptable to the National Industry Recovery Administration as well as to the several groups within the industry itself. One of the principal objects of the code is to secure stabilization of the industry, for the ultimate protection of the swine-growers of the country. Incidentally, this would include the maintenance of equitable prices for serum and virus, as well as a guarantee of a sufficient serum reserve to meet any probable demand thrown upon the industry as a result of a serious outbreak of hog cholera. The latter contingency has been met by a provision of the code which requires that each producer have on hand, by May 1 of each year, a stock of serum equal to 40 per cent of the amount of serum sold by that firm the previous year.

The code provides for the appointment of a committee to study the feasibility of a sliding scale for the market price of serum, based on the market prices of hogs. It is believed to be desirable to have an established ratio between the cost of serum and the

value of the hogs on which it is to be used. The committee will be appointed by the code authority and the report is to be made within three months of the appointment of the committee.

Purchasers and users of serum and virus have been aware, for some time, that numerous unfair methods of competition have crept into the serum-virus industry, very largely as the direct result of the keen competition for business between the various firms manufacturing and selling these products. This situation is clearly reflected in Article IV of the code, entitled "Unfair Methods of Competition." There are sixteen sections in Article IV, each of which sets forth one of these unfair methods of competition which, it is intended, the code will eliminate.

For example, the first section provides that each producer shall at all times keep his current price list on file with the code authority, and it will be interpreted as a violation of the code for any producer to sell or offer for sale serum and/or virus at prices below or upon terms or discounts differing from those specified in the price lists currently filed with the authority. Destructive price-cutting is forbidden. It is left with the Secretary of Agriculture to make the final decision in any case when this question shall be a matter of dispute.

The code places a ban on the giving or accepting of rebates, refunds, allowances, discounts, gratuities or concessions in any form, which are not shown in lists filed with the code authority. The latter shall have the power to decide whether any practice is a violation of the code. It will be regarded as an unfair method of competition for any one to defame a competitor by falsely imputing to him dishonorable conduct, inability to perform contracts, questionable credit standing, or the false disparagement of the quality of his goods, with the tendency and capacity to mislead or deceive purchasers or prospective purchasers.

The replacement of out-dated virus, free of charge, to purchasers, unless such virus had an expiration date of less than thirty days, at the time of original shipment, and/or supplying serum or virus for revaccination, without charge, is specifically forbidden. Other practices which are now taboo include the following: Guaranteeing any purchaser against loss by reason of advances in price or protecting any purchaser against loss by reason of decline in price; giving advance notice of price changes; storing for subsequent delivery serum and/or virus sold to any purchaser except at prices fixed by the code authority; selling serum and/or virus on consignment.

As the largest purchasers and users of serum and virus, veterinarians have a deep interest in the outcome of this experiment. The blame for no small part of the so-called unfair practices which have insidiously crept into the business of selling and distributing serum and virus could undoubtedly be traced to veterinarians who have taken advantage of the commercial rivalry existing between the various companies. The unbusiness-like extension of credit might be mentioned as one of the unsound practices of the industry. This never would have developed if veterinarians had not invited and encouraged it.

A meeting of the industry was held in Kansas City on March 9, and the code authority was given the corporate name: "Serum Code Authority, Incorporated." The members of the authority consist of ten producers of serum and virus, headed by Dr. E. A. Cahill, of the Allied Laboratories, Kansas City, as president, and Mr. John E. Swaim, of the Fidelity Laboratories, Chicago, as secretary-treasurer. It is expected that the headquarters of the organization will be located in Kansas City.

JOIN THE CONGRESS

One way of assuring the success of an International Veterinary Congress is by enrolling a large membership in advance of the event. There should be at least 2,500 veterinarians from the United States enrolled as ordinary members of the Twelfth Congress. Almost one-fourth of this number have already filed their applications. However, the opening date of the Congress is just a little over four months away and to round up almost 2,000 additional members between now and August 13 is going to require considerable effort. But it can be done. Eight months, six months, even four months ago, when veterinarians were approached on the subject, they said the Congress was a long way off and there was plenty of time to join. Many have joined, but more have not. The latter should do so at once.

One reason for urging prompt action in this matter is in connection with the printing of the reports. It is customary to supply each member of the Congress with a copy of each report in advance of the Congress. These separates are not to be confused with the Proceedings which will be published and distributed after the Congress. In order for the Organizing Committee to be able to proceed intelligently with the big task of printing upward of one hundred separate reports, each with the summary in the four official languages of the Congress, it is absolutely necessary to have a pretty fair idea of the probable

enrollment. Late comers may have to go without their advance copies of the report. Do not run this chance. Play safe by sending in your application *now!* You will find more news concerning the Congress on pages 669 to 671 of this issue of the JOURNAL.

***12th International Veterinary Congress
New York—August 13-18, 1934***

EXECUTIVE BOARD ELECTIONS

The Executive Board elections for the nomination of candidates, now in progress in Districts 4 and 10, will come to a close on April 14. District 4 consists of Alabama, District of Columbia, Florida, Georgia, Kentucky, Maryland, Mississippi, North Carolina, South Carolina, Tennessee, Virginia and West Virginia, and Cuba, the West Indies and South America. There are almost 500 members in this territory. District 10 consists of Michigan and Ohio, with slightly over 400 members in the two states. Nine hundred members in the two districts could have two rather lively elections if real contests should develop. One vote decided the election in District 4 five years ago.

Changes in Provincial Secretaries

Dr. John R. Cunningham, Summerside, succeeds Dr. W. H. Pethick as A.V.M.A. Resident Provincial Secretary for Prince Edward Island.

Dr. J. K. Morrow, 695 Wolseley Ave., Winnipeg, succeeds Dr. Alfred Savage as A.V.M.A. Resident Secretary for Manitoba for the current year.

Paging Doctor Daily

If Dr. Edward E. Daily (or Dailey), who was graduated from the Cincinnati Veterinary College in 1912, will communicate with the secretary of the A. V. M. A., he will receive news of interest to himself. Records in this office show that Dr. Daily formerly was employed in the meat-inspection service of the U. S. Bureau of Animal Industry at Cincinnati.

The great trouble with the young practitioner is that he stops studying as soon as he graduates.

Medical Times.

APPLICATIONS FOR MEMBERSHIP

(See January, 1934, JOURNAL)

FIRST LISTING

- CRANE, D. B. 65 Grove St., Mount Kisco, N. Y.
D. V. M., Cornell University, 1931
Vouchers: F. W. Andrews and H. J. Milks.
- JENSEN, V. K. Woodlake, Minn.
B. V. Sc., Ontario Veterinary College, 1933
Vouchers: R. A. Merrill and Harry Evenson.
- JERSTAD, A. C. c/o Puritan Poultry Corp., Atascadero, Calif.
B. S., D. V. M., Washington State College, 1933
Vouchers: C. M. Hamilton and Chauncey E. Sawyer.
- KILPATRICK, W. C. 17 N. 15th Ave., Yakima, Wash.
B. S., D. V. M., Washington State College, 1929
Vouchers: V. C. Paulman and Chauncey E. Sawyer
- NISBETT, E. E. 609 Broad St., Nashville, Tenn.
D. V. M., McMillip Veterinary College, 1918
Vouchers: M. Jacob and Wm. M. Bell.
- RUST, JOHN HOWARD, III 23 Forest St., Wellesley Hills, Mass.
D. V. M., Kansas State College, 1932
Vouchers: R. R. Dykstra and H. W. Jakeman.
- WALGREN, O. E. Platte Center, Nebr.
D. V. M., Kansas State College, 1926
Vouchers: J. E. Peterman and E. J. Jelden.
- WRIGHT, STUART L. 105 Bay St., Glens Falls, N. Y.
D. V. M., Cornell University, 1927
Vouchers: H. Clifford Murray and Adrian M. Mills.

Applications Pending

(See March, 1934, JOURNAL)

SECOND LISTING

- Barto, Lester R., Box 432, Summit, N. J.
- Bess, Vann F., Box 568, Vicksburg, Miss.
- Broberg, H. W., White Hall, Ill.
- Dimock, E. R., Merrow, Conn.
- Eggert, Matthew J., 264 Vermont Ave., Irvington, N. J.
- Gordon, J. S., Sergeant Bluff, Iowa.
- Parks, Clarence D., 1239 Main St., Honesdale, Pa.
- Thompson, J. C., State Department of Agriculture, Olympia, Wash.

The amount which should accompany an application filed this month is \$8.75, which covers membership fee and dues to January 1, 1935, including subscription to the JOURNAL.

COMING VETERINARY MEETINGS

- New York City, Veterinary Medical Association of. Hotel New Yorker, 8th Ave. and 34th St., New York, N. Y. April 4, 1934.
Dr. R. S. MacKellar, Jr., Secretary, 329 W. 12th St., New York, N. Y.
- Saint Louis District Veterinary Medical Association. Melbourne Hotel, Saint Louis, Mo. April 4, 1934. Dr. Harley B. Wood, Secretary, 2754 Meramec St., Saint Louis, Mo.

Interstate Veterinary Medical Association. Elks Building, Omaha, Nebr. April 9, 1934. Dr. G. L. Taylor, Secretary, Plattsmouth, Nebr.

Chicago Veterinary Medical Association. Palmer House, Chicago, Ill. April 10, 1934. Dr. O. Norling-Christensen, Secretary, 1904 W. North Ave., Chicago, Ill.

San Diego County Veterinary Medical Association. San Diego, Calif. April 10, 1934. Dr. L. K. Knighton, Secretary, 3438 Mountain View, San Diego, Calif.

Southeastern Michigan Veterinary Medical Association. Detroit, Mich. April 11, 1934. Dr. A. S. Schlingman, Secretary, Parke, Davis & Co., Detroit, Mich.

Tulsa County Veterinary Association. Tulsa, Okla. April 12, 1934. Dr. J. M. Higgins, Secretary, 3305 E. 11th St., Tulsa, Okla.

Kansas City Veterinary Association. Baltimore Hotel, Kansas City, Mo. April 17, 1934. Dr. C. C. Foulk, Secretary, 1103 E. 47th St., Kansas City, Mo.

Southern California Veterinary Medical Association. Chamber of Commerce Bldg., Los Angeles, Calif. April 18, 1934. Dr. T. G. Beard, Secretary, 3684 Beverly Blvd., Los Angeles, Calif.

American Animal Hospital Association. Netherlands Plaza Hotel, Cincinnati, Ohio. April 20-21, 1934. Dr. A. R. Theobald, Secretary, 4545 Reading Road, Cincinnati, Ohio.

Keystone Veterinary Medical Association. Philadelphia, Pa. April 25, 1934. Dr. C. S. Rockwell, Secretary, 5225 Spruce St., Philadelphia, Pa.

Connecticut Veterinary Medical Association. Middletown, Conn. May 2, 1934. Dr. Edwin Laitinen, Secretary, 993 W. Main St., West Hartford, Conn.

Hudson Valley Veterinary Medical Society. White Plains, N. Y. May 9, 1934. Dr. J. G. Wills, Secretary, Box 751, Albany, N. Y.

Colorado Veterinary Medical Association. Fort Collins, Colo. May 24-25, 1934. Dr. J. C. Flint, Secretary, Colorado Agricultural College, Fort Collins, Colo.

Twelfth International Veterinary Congress. Waldorf-Astoria Hotel, New York, N. Y. August 13-18, 1934. Dr. H. Preston Hoskins, General Secretary, 221 N. La Salle St., Chicago, Ill.

THE VETERINARIAN IN PUBLIC HEALTH WORK

By J. S. KOEN, Saint Louis, Mo.

Department of Public Welfare

We believe the greatest single achievement in veterinary service during the past two years has been the meat inspection service in Saint Louis. Half of the meat supply of more than a million and a quarter people is prepared under that service. Twenty-two killing-plants and 38 other processing plants are under city supervision. Ten veterinarians and ten lay inspectors constitute the inspection force. A chief, a clerk and a stenographer complete the personnel. The story of that work has been published in detail and so it is not necessary to repeat it here. Besides, Dr. W. G. Hollingworth, chairman of the Special Committee on Meat Hygiene, gave a most comprehensive report on this subject yesterday afternoon in the general session. Dr. Hollingworth's report should be studied carefully on publication, for it contains many valuable suggestions that should be given serious consideration by members of this Association.

A few statements of general knowledge will bear repetition, in order that their importance may be emphasized. Meat inspection is a public health service whether it be federal or municipal. Yet neither federal nor municipal meat inspection came into existence because of any demand that public health be protected. Federal meat inspection was inaugurated because Germany had placed an embargo against American pork for the reason it was infested with trichina. In some sections of Germany their own pork was infested with more trichina than American pork. Their embargo protected the German packers and threatened the export trade in American pork. Our packers appealed to Congress for help and the microscopic inspection of pork samples was started. From this work has been developed the great American system of meat inspection that is recognized as the very best in the world. It is the pride of America and the envy of every other nation.

Likewise municipal meat inspection in Saint Louis did not follow any demand for protection of public health until after the most extensive and aggressive advertising campaign that has ever been waged for such service. It resulted from an economic war between U. S.-inspected plants and uninspected plants.

*Presented at the seventieth annual meeting of the American Veterinary Medical Association, Chicago, Ill., August 14-18, 1933.

The veterinary profession has not been even remotely responsible for the inauguration of either federal or municipal inspection service that means so much to the profession. It has been forced upon us for the reason that no other class is trained and competent to conduct it. Only about 70 per cent of all meats offered for sale to the public is now under some form of supervision. There remains 30 per cent that needs such inspection and that offers a real opportunity for the extension of veterinary service. This 30 per cent is not going to be forced upon us as the 70 per cent has been. If we get it, we must go out after it. It is well worth while and an earnest effort should be made to secure it as speedily as possible. The strength of federal meat inspection is that it is free of political interference. Scientific knowledge and judgment decide the disposition of every diseased carcass and all unfit meat food products.

FREE FROM POLITICAL INFLUENCE

The strength of Saint Louis municipal meat inspection is that it too is free from political influence and that in every essential detail it compares favorably with federal inspection. Our inspection service has been accepted by the public it serves as equal to federal inspection. We are proud of our work because it has been well done and for the further reason it has attracted favorable attention to veterinary service and increased public respect for our profession. To accomplish the results that have been achieved in so short a time and without a single court case is a remarkable record. I am not seeking to boast, but I cannot refrain from stating these facts. Every state and municipality that inaugurates or maintains meat inspection should follow the B. A. I. Rules and Regulations as closely as local conditions will permit. They should also maintain real inspection under veterinary supervision.

Meat is the basis of at least one meal each day in practically every home and the importance of a wholesome meat supply that is free of disease and fit for human food cannot be overemphasized. Yet meat, generally speaking, is food for adults. Milk is baby food. It is the sole diet for many infants and the principal diet for young growing children. Every safeguard known to science should surround its production in order that the health and lives of babies and young children may be protected. Until recent years veterinarians have not been extended the consideration due them in milk inspection service. No milk inspection is worthy the name that cannot certify to the healthfulness of the source of milk—the cow. Only veterinarians have the training

and experience to make physical examinations and determine the healthfulness of cows. They have been trained in sanitary matters, in the proper methods of feeding live stock and the very important problem of improving the herd by better breeding practices. Efficient milk inspection demands such qualifications, and thereby becomes essentially a veterinary service.

The ideal situation in milk control, toward which all health officers strive, is an *adequate* supply of *clean* milk from *healthy* cows, produced by clean, healthy workers, transferred from the farm to the city in a *sanitary* manner, where an additional safeguard is provided by *thorough* pasteurization, then bottled in *sterile* bottles and delivered to the homes a *safe* product. Unfortunately, the ideal is possible of attainment under present conditions only after a long and patient educational campaign. As things now stand, we must start at the other end and work backwards toward the idea. We know that farmers are careless and do not send us milk as clean as it should be. We know also they do not report diseased cows immediately as the law requires. I am beginning to wonder if milk is really such a good medium for the transmission of disease and, if so, why epidemic after epidemic has not followed in the wake of practices that we have found. The probable answer is that physicians have for years advised the boiling of milk for babies. Without this precaution there is no telling what might have happened.

"DIRTIFIED" AND "CERTIFIED"

In his book, "Udder Diseases of the Cow," Dr. A. S. Alexander, of Wisconsin, describes two grades or classes of milk—"dirtified" and "certified." I am forced to the conclusion that "dirtified" applies to the average run of milk. We are having to take this faulty product and attempt to make it *safe* by pasteurization. And what crimes are being committed under the guise of pasteurization! Plant operators seem to think that like charity it can be made to cover a multitude of sins. Some theological authorities tell us there is an intermediate stage between earth and Heaven where the souls of men may have another chance for redemption. I am afraid the stay in that intermediate place will have to be much longer than their span of life on earth if some dairy plant operators ever get a chance at Heaven. Our immediate problem is to correct as many evils as possible that have surrounded the *attempts* at pasteurization that we may make a thorough job of it and thus provide a milk supply that is at least *safe*.

We are told that bread cast upon the waters returns many fold to the giver. For many years, Dr. Louis A. Klein has been casting veterinary bread upon the waters in which students of milk inspection were trying to learn milk control. Sixteen years ago, a young medical man was taking a course in public health at the University of Pennsylvania. During this course it was necessary for him to take instruction in the Veterinary School on milk control, tuberculosis in animals and other animal diseases. He relates now, with considerable zest, of his association with veterinarians who were doing tuberculosis testing, and making physical examinations of cows on dairy farms. He tells of the high regard he held for them because of their earnestness and efficient work. He is most enthusiastic when he describes his respect for Dr. Klein under whom he obtained his instruction in milk hygiene. He still has Dr. Klein's notes, from which his book, "Principles and Practices of Milk Hygiene," was published. These notes were taken in long hand, during class hours, prior to its publication. He determined then that when he became Health Commissioner he would extend to the veterinary profession far greater consideration in health work than had been accorded it. On May 1, 1933, that young medical man, Dr. Joseph F. Bredeck, became Health Commissioner for the city of Saint Louis. His first attention was turned to a reorganization of the Health Department to conform more closely with the standard of the American Public Health Association and the U. S. Public Health Service. This required a new ordinance to legalize many of the changes he proposed.

NEW ORDINANCE ADOPTED

On June 20, 1933, the new ordinance was passed by the Board of Aldermen and immediately signed by the Mayor. The new set-up provides four key positions or sections, *viz.*, a Medical Section, under the direction of a physician who acts as Assistant Commissioner; a Laboratory Section, combining bacteriological and chemical work under one director, a veterinarian; a Section of Food Control, embracing milk inspection, meat inspection and food inspection, under the direction of a chief, who is a veterinarian; and a Sanitary Section, under the direction of a sanitary engineer. Thus, on Dr. Bredeck's staff are one physician, two veterinarians, and an engineer. The veterinary profession owes a great debt of gratitude to Dr. Bredeck for the confidence he has in us and for the advancement in public esteem his appointments make for veterinary service. He has also kept the veterinarians on milk and meat inspection from political influence and has

placed them directly under a professional committee appointed by the Mayor to pass on all professional appointments. He has maintained the veterinary status on meat inspection against considerable pressure to reduce it and has made provision in the new ordinance for an additional veterinary supervisor on meat inspection, a veterinary supervisor and two assistant veterinary inspectors on milk inspection. Two years ago, there were two veterinarians in the Health Department. Today we have 17.

HOW APPOINTMENTS ARE MADE

The manner in which appointments were made to fill these positions may be of interest. We had six vacancies to fill—three on meat inspection and three on milk inspection. I was given free rein to select veterinarians whom I considered would best meet our requirements. The first appointment went to an Illinois inspector who had been testing cattle for tuberculosis for several years. I then selected two practitioners residing in the Saint Louis district. These three men are well acquainted with local conditions and can serve on either meat or milk inspection. Another selection was a veterinarian who had had long experience in the U. S. Bureau of Animal Industry and who for twelve years had been an instructor in milk and meat hygiene in one of our veterinary Colleges. Another was a milk specialist with eight years experience in charge of milk and meat inspection. His record is enviable. It was felt that an outstanding expert in milk processing was needed for Supervisor. We were most fortunate in being able to secure the services of Dr. E. C. McCulloch for this responsible position. The professional committee to whom the Mayor refers all professional appointments approved each of these appointments, although we had to go outside the State for four of the six appointees. It is quite in order to state that I was selected to examine all lay applicants for positions as milk, meat and food inspectors. I was authorized by Dr. Bredeck to accept only qualified men for these positions. Unless the applicant could show practical experience in the work he was not appointed. Thus the entire personnel of 43 inspectors in the Section of Food Control was selected by and remains under the direction of a veterinarian.

If such a program is justified for Saint Louis, there are numerous other cities that should follow this lead. The program of Health Commissioner Bredeck, of Saint Louis, is worthy of careful study by the deans of our veterinary schools and by all veterinarians who are concerned in the development of new outlets for

veterinary service. Thus the bread cast on the waters years ago by Dr. Klein is indeed returning to the profession many fold. I quote from an address by Dr. Bredeck, before the Missouri State Veterinary Association last month, in Saint Louis:

The chemical, bacteriological and clinical subjects all emphasize the necessity for careful sanitation in not only milk but in water supply, so today we find the veterinarian thrown into all the related fields of science of veterinary medicine and medicine itself. The possibilities for the future of veterinary medicine are enormous. As I see the future of veterinary medicine in public health control I find that men must qualify in the future in the basic sciences more than they ever did in the past. They must be well grounded in pathology, physiology, chemistry and sanitation. Unless one is well balanced in these related fundamental sciences, he is laboring under a terrific handicap.

I am proud to state that in our own Health Division we have about 15 veterinarians assigned to milk and meat control. The food control section itself is placed under a veterinarian; our laboratory is handled by a veterinarian who has specialized in bacteriology and immunology. There is a great future and field for service the surface of which has hardly been scratched. There is a growing demand for veterinarians associated with public health departments in various sections of the country. We need more of them and their influence can be felt in our municipal, state and federal government by coordinated effort.

The great educational programs in public health demand the assistance of veterinarians to do their share in the public health programs of any well organized municipal, state or federal health service. Economic aspects of the country demand more than ever concerted effort along the same lines in order that we may conserve the animal husbandry and safeguard the health of individuals.

NO SELFISH MOTIVE

As far as I have been able to learn, most cities employ laymen for milk control work rather than veterinarians. In many instances sanitary engineers have been employed to direct milk control work. The engineers comprise an energetic and ambitious group who have been pushing forward in the field of public health, rendering a very valuable service. It is possible that the sanitary engineer will take over this phase of veterinary service unless we bestir ourselves and we may find this very promising field lost to us through lack of foresight and aggressiveness on our part. Milk inspection will not be forced upon us as meat inspection has been. In milk inspection lies another opportunity for our profession to sell its service in an ethical manner, to increase the incomes of resident inspectors who may be employed, and to secure openings for full-time veterinary inspectors. This is not a selfish proposal to increase incomes and make more jobs for veterinarians. The public would benefit even more than ourselves. The farmer would benefit by keeping their herds healthy, thus

increasing milk production at less cost. Dangers of lingering diseases would be removed. By consultation with the veterinarians while on the farm making inspections they could plan the building up of their herds by improved breeding methods and they would receive added benefits by advice on proper feeding. Of more importance to the farmer is the increased market for better milk. Cities employing practitioners as resident inspectors can render a better service for less cost than by sending an inspector from the city to a farm many miles away, entailing increased expense and loss of time in travel. The public would benefit by having conditions corrected earlier and at less expense and by having neglected cows removed.

THREE IMPORTANT PROJECTS

In health work three projects are considered as of prime importance, *viz.*, water supply, sewage disposal, and milk control. Millions are spent annually by every large city to insure pure water and an adequate sewage disposal. These are engineering problems. For milk control it is difficult to secure paltry appropriations that permit of only the most superficial control work. Milk control is a veterinary problem. We have a huge task before us to educate the public to the necessity for an inspection service that insures an adequate supply of clean, wholesome milk from healthy cows. To accomplish this the appropriations will have to be multiplied many times. As appropriations are increased for this work, there will be more openings for veterinarians to perform the service. The number of veterinarians needed will be in proportion to the number of cows in a given milk-shed. For example, there are some 16,000 farms supplying milk to Saint Louis. The average herd has about ten cows in it. Each cow should have a physical examination at least twice annually.

I would like to see a program worked out whereby local practitioners who are qualified would be accredited and employed by the cities as resident inspectors and this work turned over to them. They could be remunerated either as part-time employes or on a fee system. They would necessarily have to be under the direct supervision of the Chief Milk Inspector of the city and be held strictly responsible for the healthfulness of all cows assigned to them. Under such a plan the veterinarian would serve both as inspector and practitioner. The city would pay for the inspection service, while the farmer would be required to pay only for treatment that might be necessary. Under the present system a veterinary inspector for the Health Department will visit a farm to

make inspections. If he finds a diseased animal he must insist that the local veterinarian be called or the animal disposed of. This procedure frequently results in strained relations and prevents coöperation. If the local veterinarian were also the resident inspector, he could make the inspections necessary and treat the diseased cow. The combined service could be rendered for less cost than the inspection alone when done by the city inspector. The plan suggested is one of helpful service and economy for all concerned that promotes coöperation, while the old system is one of wastefulness and penalty that often arouses opposition and defeats coöperation.

DIFFICULTIES TO BE OVERCOME

I realize the objections that can be raised against such a program. It will be charged that local practitioners will not attempt to enforce requirements of health officials for fear it will hurt their practice with the clients involved. These objections are not unsurmountable. The practitioner would be acting in his capacity as a professional man even though performing the task of inspection. The regulatory work, when necessary, could be left to the executive officer of the Health Department. Present laws require the immediate reporting of diseased cows by the owner. We know this is not complied with in many instances. If the local veterinarian is not a representative of the Health Department he is apt to consider his interests are with the client. He withholds the information and shields the client in evading the law. He violates professional ethics in doing so and excuses himself in his own mind on economic grounds. In case he were a resident inspector for the Health Department, he would report such cases promptly and could easily justify his action with his client. If such a plan could be worked out, the Health Department should have the active coöperation of the local veterinary association. In case a practitioner failed in the performance of his duty he should have a joint hearing before the Health Commissioner and representatives of the local association. If found guilty he would be removed from the list of accredited veterinarians and expelled from the local association. Increased public respect and esteem for veterinary service would follow such a course.

The inspection of general food stores, shops, markets, hotels, restaurants, bakeries, commission houses, warehouses, wholesale grocery and produce concerns, etc., is not essentially a veterinary problem. However, such inspection dovetails into both milk and

meat inspection and fits nicely into such a grouping. For this reason the Section of Food Control includes milk, meat and food inspection and the entire work is placed under the direction of a veterinarian. We have eight experienced lay inspectors for this work.

DISCUSSION

DR. LOUIS LEONPACHER: I think the talk Dr. Koen has given of the veterinary profession in general is fully recognized. I want to ask Dr. Koen, in this connection, two questions; but, before doing so, I would like to tell you a little story. I think you read about this in the newspapers about a half year ago, but it is so good that I think it ought to be repeated.

Not long ago, the Senate made some investigations in New Orleans, and one of the departments scrutinized was the State Board of Health. They checked up where the different moneys were coming from and going to. When the Board of Health was discussed, some of the employees were called before the meeting, and one of them was the meat inspector. When asked if he were a meat inspector, he said, "Yes, sir." When asked how he got the position, he said that he had been appointed, and that he got the job through Mr. So-and-So. When asked what qualifications he had, he said, "I haven't got any." They asked "Do you know a tuberculosis germ when you see one?" He said, "Well, sir, it looks like corn meal." That story is in black and white in the record.

I feel that is not the way they do in Saint Louis. I think it ought to be done elsewhere as it is done in our progressive cities, and we ought to interest ourselves to find out how that can be done. Personally, I feel that a private practitioner out in the country hasn't a chance to interfere in these mechanisms that result in the adoption of one system or another for meat inspection work. I think that move has to come from higher up. And a lot of things have come lately from higher up that we will have to swallow and swallow readily. I think what we need is a system of extended federal supervision. We have the same thing in tuberculosis work now. That is not interfering with the local authorities—the B. A. I. today tells us how to test a cow. They insist that this man has to be qualified to know what he is doing. I think we need something like that in meat inspection work. Some instruction is necessary.

I want to know if Dr. Koen knows of ways and means whereby the lower ones in the veterinary profession can push this work. It is impossible for me to see how any state government can be induced to do the right thing in this connection by any private veterinarian, and I would like to know how it is done.

The second question is this: Even in small municipalities—I am living in a town of 6,000 inhabitants—meat inspection is absolutely essential. If somebody is not convinced, all he has to do is to pick up a newspaper any day, summer or winter, and see how many people suffer with ptomaine poisoning. It covers a territory that we do not know anything about, and I think fifty per cent comes under the heading of lack of meat inspection. In other words, the smaller municipalities are just as much concerned.

Fortunately, the American public does not suffer so much because the American public does not eat raw meat. Dr. Koen referred to Germany, and it is absolutely essential in Germany because German people do eat raw meat. In Germany you can not sell a pig on a farm without the local veterinarian making the examination and reporting to headquarters that the pig is o. k.

Going back to my question: we all passed through school and had our instruction in meat inspection work. In the University of Munich, where I had my training, we had one year of meat inspection work, and if I had obtained a job the following year as meat inspector, I guess I would have recognized corn meal. Today I am not competent enough to accept a position of this sort, even if it were offered to me. I would like to know how Dr. Koen trains his force, from what source of supply he draws his men, and how the country practitioner could have an opportunity to familiarize himself with the different phases of meat inspection if he is called upon to do this work.

DR. KOEN: Our veterinarians were selected by a civil service examination. Any veterinarian graduating from one of our veterinary schools today should be well grounded in the principles of milk and meat inspection work. Those of us who were graduated several years ago did not get much of that work in our course of study. Almost every one of our men had to secure that actual training in meat inspection after he became a member of the force. Of the ten veterinarians who were appointed in Saint Louis, four of them had had some B. A. I. meat inspection experience, and the others had to obtain that knowledge after they were assigned to the work. But any veterinarian who applies himself at all can readily adjust himself to conditions in meat inspection work.

Under appointments that were made this year in St. Louis, I was given the opportunity of going any place in the country to select veterinarians that I knew were qualified to perform this kind of service. The charter in Saint Louis requires that anybody appointed to a city position must reside for at least one year previous within the city of Saint Louis. In the case of veterinarians, that was impossible, and the charter requirement was waived. So I selected men who would fit in with our organization and who were qualified for both meat and milk inspection, in order to build up the quality of the service that we are giving in both branches of the work.

Now, then, how are you going to get this information before the public? Years ago we heard that there were three very effective means of advertising—telegraph, telephone, and tell-a-woman. Wherever you live you have women's organizations. When the inspected plants in Saint Louis took it upon themselves to sell the idea of U. S.-inspected meats to the public in Saint Louis, they hired a publicity expert. I think they paid him about \$350 a week. The first thing he did was to begin telling the women. He had representation in every ladies' organization in the city and every civic organization in the city. He got the government bulletin on meat inspection and had copies reprinted and sent them to the ladies in the homes. He went into the schools and gave lectures to the children. Then he divided the city into precincts and sent a lady into each precinct to ring the door-bells and ask, "Do you use U. S. Government-inspected meat, or uninspected meat." Well, the housewife didn't know. It was merely a campaign of publicity for U. S. Government meat inspection. Within three months, the billboards, instead of reading "Fifty per cent of all the meat sold is U. S. Government-inspected," read "Seventy-eight per cent of all the meat sold is U. S. Government-inspected." Then the uninspected meat houses came to the City Council and requested a meat inspection ordinance, because the public was then demanding inspected meats.

We patterned after the B. A. I. inspection. I got copies of the Bureau's regulations and placed them in the hands of our inspectors. I said to them, "These are our regulations. Unless inspection is inaugurated and maintained on this plane, there is no use starting it at all, because a sham inspection is worth nothing."

DR. A. G. BOYD: I have listened with great interest to Doctor Koen's discussion, and believe the citizens of the great city of Saint Louis are to be congratulated on having such a capable veterinarian at the head of their food inspection department.

I hesitated before getting on my feet because I am from California, and they tell us we are inclined to be great boosters. We are doing in California on a statewide basis what Doctor Koen has told you Saint Louis is doing as a city. Ninety-five per cent of the meat consumed is produced under inspection—federal, state, or state-approved municipal inspection. State meat inspection in California operates on a fee basis, the slaughterer paying the Department of Agriculture for inspection service in proportion to the volume of business conducted. The present law exempts counties having a small population from post-mortem inspection of carcasses. Exemption pertains principally to mountain counties.

We have under state inspection in California 333 establishments and of that number 181 are under direct state inspection and 152 are state-approved municipal establishments. California employs at this time 129 veterinarians in its state meat inspection work. In addition several veterinarians are employed by municipalities. Inspectors are all graduate veterinarians who have passed a civil-service examination which is absolutely free of politics.

The state law of California requires that the meat inspection regulations of the State conform as far as possible to the rules covering meat inspection of the United States Department of Agriculture. We have taken the federal regulations and inserted the word "California" in place of the term "United States."

Meat and milk inspection work in the state of California is under the supervision of the Chief of the Division of Animal Industry. Our state law requires that this position be held by a graduate veterinarian.

Should any of those in attendance be interested in the California plan, we would be very pleased to send details if you will address your request to the Chief, Division of Animal Industry, State Department of Agriculture, Sacramento.

DR. R. W. WILLIAMS: I feel incompetent to enter upon such an important discussion as this, but I wish to compliment Dr. Koen upon his wonderful paper in a field that is so important as this to our profession.

The meat situation is well laid out and covered by the B. A. I. but the field of milk inspection is being badly neglected and imposed upon by the laity. And this field is a field of the veterinary profession and one in which we need to take our place.

Dr. Koen has mentioned only a small part of the work they are doing. I happen to know what they are doing. He did not go into detail and cover a lot of features which may be counted as small, but all-important for public health.

In regard to the inspection of meat, I happen to know, through what agents of packing companies have told me, that in Saint Louis they will not allow a retail butcher to keep preservatives in his place, but when you get out of Saint Louis I will venture to say that in the majority of local meat markets you will find under different trade names meat preservatives, sold as cleaners of equipment and meat-boxes, which butchers put in their hamburger and in their sausage, or meat which could not be sold otherwise.

We all know that milk can not be washed and cleaned. Pasteurizing the milk does not clean it. We have in our little city municipal milk and meat inspection which I have had under my control for the past four years. We have adopted what was at that time the Standard Milk Ordinance, but which is now the U. S. Public Health Service Milk

Ordinance, which, if carried out, will protect and give you a safe milk supply. But milk must be produced clean on the dairy farm to be a clean and safe milk supply.

The veterinarian should conduct himself in his community in such a way that his recognition will take its place with the Health Department. I located in Eldorado in 1922. After I had been there just a few weeks, I received a letter from the County Medical Society giving me orders to remove the A. V. M. A. emblem from my automobile, saying that it was for practicing physicians and physicians only. I took it up with Dr. Hoskins and he wrote me a letter, and through my State Medical Society we soon had the matter settled. Then I took part in our civic organizations, joined the Rotary Club, and now I am a member of the Board of Directors of our Rotary Club, a member of our City Board of Health, and our Health Department is under my control with a part-time M. D. for examining health certificates and protecting human epidemics. I know that there are others who have surpassed me by far and can take part in the field the same as Dr. Koen has done in Saint Louis.

There are so many features that belong to our profession that are being neglected. Take myself, for instance. I had never done meat inspection work before, but I read a lot of literature and books, and up to the present time I have not had any setbacks.

In connection with meat inspection, we had some little trouble with poultry. Poultry, as you all know, is kept in the markets and sold. We required them to be drawn, heads and feet removed at the place of slaughter, the giblets dressed, wrapped in wax paper and replaced in the body cavity. We met with a little difficulty at first. Of course the packers came in with barrels of chickens with the entrails in them, but we notified all salesmen they could be shipped in but could not be sold on the local markets. And now the packers are sending them in drawn as we asked for.

When I first started inspecting the dairies for sanitation, examining the milk-pails, I found them full of maggots around the tops and bottoms, and other insanitary conditions equally as unwholesome. But today I am glad to say that we now have our dairies all producing grade A milk. They use chlorin sterilization and steam afterward, and meet the 25 items of milk sanitation as required by the milk ordinances.

We get good coöperation out of both the public and the dairymen by coöperating with them. But we as veterinarians must give them something before we can expect to receive something in return.

I want to commend Dr. Koen again for giving a paper at this meeting as important and as basically needed in our country as a whole.

DR. C. E. CORRON: Dr. Williams said their ordinance requires that all poultry placed on their market must be drawn. This is interesting to me for the reason that when we undertook to initiate avian tuberculosis control work we appealed to the packers in order that we could obtain a market for reacting birds. They explained that they could not pay anything for reacting poultry and buy them subject to inspection, thus furnishing a return to the owner for the salvage of the birds. The packers gave as their reason that if a bird is drawn or even if the skin of a bird is broken and the carcass is then placed in cold storage the meat will turn black and will not be marketable. I would like to have you explain how long they keep the birds after they are drawn and how they keep them.

DR. WILLIAMS: We receive the birds from about six different packing companies, and quite a number of the packing companies are wrapping the birds in wax or parchment paper. We require them to dress the giblets, wrap them in wax paper, and replace them in the body carefully. I believe both the Dole and Morrell Packing companies are

wrapping their poultry in wax paper. Up to the present time we have not found any birds that have come in dried out or discolored. That was the common argument that I received in my correspondence with the packing companies. In fact, I talked with Mr. Swift, at the Kansas City meeting on this question, and he said that they would try it.

DR. J. L. DAVIDSON: I might say that I have been connected with milk and meat inspection in the city of Kalamazoo for just a month and a half, so I am rather new in the field, except for the work I had in school. I have the title of Assistant Food Inspector, which is a part-time job, and I have a layman over me as Food Inspector. He has had this position for about 25 years; it is a political job with him. Our Health Commissioner is a physician, and I have had fine coöperation from him. There were 36 applicants for the position I have and two of these were medical men, and I was appointed over all of them.

Fine Quarters for Army Veterinary Students

Students at the Army Veterinary School, Army Medical Center, Washington, D. C., attend classes and do their laboratory work in the handsome structure shown in the accompanying photograph. The building is known as the Medical Department Professional Service School. The right wing is devoted exclusively to the education of Army veterinarians.



MEDICAL DEPARTMENT PROFESSIONAL SERVICE SCHOOL

The Veterinary School and the Laboratory are now consolidated as one unit, comprising the chemical and bacteriological laboratory, complete x-ray laboratory, laboratory for testing forage, operating-room for experimental surgery on small animals and stalls in the basement for large animals, in addition to the library, classrooms and administration offices.

The building is a permanent structure planned and erected for school purposes.

TREATMENT OF CHRONIC BOVINE ENDOMETRITIS*

By OTTO STADER, *Geneva, Ill.*

The treatment of chronic bovine endometritis by irrigation, for the past two decades, has experienced periods of wide acceptance, followed by periods of only slight interest. The causes that govern the lack of interest that the general practitioner has applied to this problem, after the primary wide acceptance following the introduction of the treatment of this disease by Albrechtsen, Williams and others, can be readily divided into three different groups:

First, as the work was introduced, it tended to become a specialty, which resulted in a number of men applying the major portion of their time to the problem, while others, due to the pressure of general country practice, were unable to spend the time to become fully informed regarding the problems of sterility and the successful treatment thereof by instrumentation.

Second, the number of necessary treatments at definite given intervals was such that, if strictly adhered to, would be highly impractical for the general practitioner, whose time is not entirely workable on a given schedule, and therefore many failures resulted from his inability to treat the animals with any degree of regularity.

Third, the economic value of the animals in question was in many instances so small that the numerous treatments required would in most cases have been prohibitive. This work has been followed only by the large, wealthy breeders who have certain blood-lines in their cattle that they wish to continue and, for that reason, would gladly spend considerable time and money to overcome the breeding problems regardless of economic consideration.

For the above reasons, the writer has felt the need of simplifying the treatment of endometritis, which, according to the opinion of most investigators in this country and abroad at the present time, is responsible for the largest economic loss in the entire problem of sterility. Fully 85 per cent of the sterile cows that we are asked to treat suffer primarily from an infected endometrium with such problems as oöphoritis, salpingitis and cervicitis as complications.

It should be kept in mind that any improvement to be made should include primarily a method that could be more extensively

*Presented at the seventieth annual meeting of the American Veterinary Medical Association, Chicago, Ill., August 14-18, 1933.

applied, and that it should be of such a nature that not more than one or two trips would be necessary to bring about a large proportion of cures, and that the treatment should be so simplified that it would not require the services of a specialist, but could be applied by the general practitioner to cattle of ordinary value, as well as valuable ones, thereby largely increasing the scope and value of this work to the cattle industry.

TYPE OF ENDOMETRITIS BEST ADAPTED

Perhaps it would not be amiss to make myself clearly understood regarding the type of endometritis, which lends itself to successful treatment with the method that I am about to describe. It hardly seems necessary to state that the chronic endometritis has as its forerunner an acute form of the disease, the result of any of the well-recognized pathogenic factors such as retained placenta, hematogenous infection of the reproductive tract, or infection of the uterus by breeding females to an infected sire. The resulting acute endometritis, by virtue of the general resisting forces of the animal, usually becomes subacute and then chronic. To be sure, some cases completely clear up of their own accord, but in the majority of instances there is a residual infection remaining that may or may not be readily detected by examination of the vaginal secretions or by rectal palpation of the genital tract. Where the vaginal secretions are of a mucopurulent or catarrhal character, and the specific case of some time standing, a diagnosis is at once definitely chronic endometritis. However, in many cases of sterility where the vaginal secretions are apparently normal and where rectal palpation of the genital tract does not reveal any pathological changes, and yet the animal does not conceive to repeated breedings, uterine irrigation with a clear antiseptic solution or normal salt solution usually will reveal the presence of numerous minute pus flakes in the return flow, indicative of infection of the endometrium. It is, therefore, endometritis of the uterus of approximately normal size, the treatment of which I wish to stress, not the subinvolved organ.

In the treatment of sterility as a herd problem, we have assumed that cases of retained placenta result in a chronic endometritis of varied duration and that, if these animals are not given proper attention, many of them will suffer from at least temporary sterility, and often permanent sterility. In order to keep the breeding efficiency of a herd at a high level, we have, therefore, gone on the assumption that insofar as the majority of

cases are concerned, retained placenta is a definite forerunner of endometritis, very likely to result in either sterility, or endometritis plus pregnancy when bred, which is also extremely undesirable. We have made it a rule, therefore, to treat all of these cases just as soon as the uterus has involuted completely to approximately normal size. This occurs usually in about 30 days. We have found also that by so treating this group of animals we have greatly lessened the number of secondary complicating diseases, such as oöphoritis, salpingitis and cervicitis, which do not lend themselves to treatment by merely applying uterine irrigation, but can be prevented largely if uterine infection is not permitted to become of long standing.

The type of chronic endometritis that follows uterine infection *via* the blood-stream or by breeding females to infected males is essentially the same as the type having retained placenta as an etiological factor. It is usually first indicated by the failure of the animals to conceive, at which time this problem is brought to the attention of the veterinarian.

TREATMENT FREQUENTLY MISDIRECTED

As mentioned above, the treatment of sterility in the past decade has been largely a matter of stereotyped procedure, and far too great stress has been laid upon manual manipulation of the ovaries and uterus *per rectum* without sufficient application of methods and procedure which would tend to relieve the infection of the endometrium, which is really the most important. This has probably been due to the aforementioned handicaps or shortcomings of the number of uterine irrigations necessitated and the skill required to treat these animals successfully.

Treatments in the form of mixed bacteria, both stock and autogenous, have had their turn as well as endocrine therapy. While all of these methods have certain merits, they also have many shortcomings, and the following procedure which I will outline is not intended to displace procedures that have merit in the hands of practitioners, but it is only meant to be used in conjunction with these procedures when a definite diagnosis of chronic endometritis has been established.

In studying the problem of uterine sterilization, and I use the term "sterilization" in a broad sense, meaning by it to have the endometrium free of pathogenic organisms and resultant pathological discharges, it appeared to me that a logical prospectus of the problem would include the simple presumption that chronic endometritis is nothing more or less in reality than an infected

cavity within the body; said cavity having an opening to the exterior. In this way, endometritis closely resembles a flesh wound of traumatic origin, differing chiefly only in the type of tissue exposed to the exterior.

In reviewing the work of numerous investigators on the treatment of wounds, we find the classical work of Carrel and Dakin outstanding. Their work has enabled them to treat heavily infected wounds by definite simple procedure. They were able to sterilize these badly infected wounds within 24 to 48 hours after treatment is instituted, to the extent that the sterilized wounds can be sutured, rapid healing ensuing with a very limited amount of cicatrization. The thought occurred to me that, by visualizing the problems of treating chronic endometritis as directly analogous to the treating of an infected wound, it might be possible to accomplish a sterilization of the uterus just as Carrel and Dakin were able to sterilize wounds.

THE CARREL-DAKIN TREATMENT

A brief review of the Carrel-Dakin process of wound sterilization will probably be in order. Chiefly, it is a matter of removing as much foreign material from the wound as possible, and then so slashing the wound as to bring recessed pockets into full contact with the Dakin's solution at hourly intervals for at least 24 to 48 hours, depending on the wound. My problem, therefore, in attempting to apply the Carrel-Dakin technic to the treatment of chronic endometritis was to devise a method of applying the Dakin's solution of proper concentration at intermittent periods. It will be interesting to note that the "cup-shape type" of wound, that is, a wound that could be kept filled with the solution constantly, was the type of wound that would yield most readily to the treatment by Carrel and Dakin. Here we see the close similarity between the uterine cavity and the cup-shaped wound, which I believe is equally a big factor responsible for the success that has followed this type of treatment.

The first step was to design a uterine catheter which could be fixed to the cervix, remain in place over at least 24 hours without injuring any of the structures and which would act as a transporting tube for the intermittent instillation of the antiseptic solution, and also act as a drain for the excess that was applied, as well as the excess uterine secretions stimulated as a result of the treatment.

As in many instances, we started with designing the most complicated device that the brain could imagine, and after three

years, we ended with a very simple catheter of about 14 inches in length, and approximately $\frac{3}{8}$ inches in diameter. Five inches from the point of the catheter is a clamp. To the posterior end of the catheter, a piece of flexible rubber tubing about 14 inches long is applied. The catheter is inserted into the uterus of the animal to be treated, and the clamp fixed to the posterior extremity of the cervix. The rubber tubing then extends to the exterior *via* the vagina. In the average case, the tip of the catheter will protrude into the body of the uterus about the length of one inch. Next, the matter of the proper fluid with regard to nature and strength had to be thought of. Naturally, we turn to Dakin's solution of sodium hypochlorite. By purely empirical methods, we finally arrived at the conclusion that a solution of sodium hypochlorite of extremely low causticity, which, when diluted, would represent about 800 and 850 parts per million of available chlorin in water, was a solution of the necessary strength to insure sterility of the uterus in the majority of the cases when treated 24 hours, and at the same time be sufficiently non-irritating to have no ill effects. This will result when one part of B-K* is added to 40 parts of water. Such a solution, containing .003 per cent calcium hydrate as an alkalinizing agent, is practically non-irritating. I have constantly refrained from using any other commercial sodium hypochlorite, chiefly because I am not well informed concerning the ingredients or stability of products other than B-K, and also because the wide distribution that this sodium hypochlorite solution enjoys makes it readily available to every veterinarian with a minimum amount of delay and inconvenience.

QUANTITY OF SOLUTION TO BE USED

The problem of the quantity of the solution to be instilled at hourly intervals for 24 hours was determined by ascertaining the volumetric capacity of the average envoluted uterus secured from the abattoir. It was found that its capacity was approximately 100 cc. We, therefore, decided on the instillation of four ounces (120 cc) as about the proper dose, realizing that the excess solution that was instilled into the uterus would be evacuated immediately through the catheter and tube. The treatment, then, consists of instilling, with a bulb-syringe, the warm, diluted sodium hypochlorite solution at hourly intervals for 24 hours. The animals show no inconvenience from this procedure, and at the end of 24 hours, the catheter is unfastened from the cervix and with-

*Manufactured by General Laboratories, Madison, Wis.

drawn. At this time a number of very important phenomena are in evidence. First, the uterine secretion exuding from the cervix usually will be found to be very profuse and tinged mildly yellow, which is the result of serum and lymph and leucocyte extravasation into the uterus induced by the sodium hypochlorite solution. The work of Carrel and Dakin and others lays a great deal of stress upon the ability of sodium hypochlorite solution, when so applied to wounds, to stimulate lymph and leucocyte extravasation into the wound as well as acting directly upon surface organisms. The bactericidal action of these secretions accounts also for the very beneficial effect of this type of treatment against the more deeply located infections in the tissue underlying the structures that are in immediate contact with the antiseptic solution.

DURATION OF TREATMENT

Rectal palpations of the genital organs now reveal a uterus that is extremely hard and cordy, simulating the uterus at the time of estrum. This is further evidence of the vascular phenomena induced by the treatment, and this condition of the uterus will remain for as long as three weeks, gradually diminishing. During the first ten days or two weeks after treatment, the profuse uterine discharge of mucus, leucocytes and lymph will also be very much in evidence, after which time it gradually diminishes. In extremely obstinate cases, those of long standing, we have applied the treatment for 36 or 48 hours when the above vascular phenomena were very much more in evidence, but the 24-hour treatment seems to be sufficient in the average case of chronic endometritis.

Bacteriological examination of uterine content by means of culturing the return flow from the infected uterus and comparing that with the uterine secretions induced by the treatment reveals that, while in the former numerous pyogenic organisms can readily be cultured, when the treatment has been applied for 24 to 36 hours, the resultant uterine secretions are bacteriologically sterile, and if collected in a sterile test-tube will remain so, even after incubation for several weeks.

While it is not necessary to treat the animals 48 hours, it is interesting, if we wish to demonstrate what actually takes place as the result of this treatment, to treat an animal for 48 hours, then the next day collect the uterine secretions by even as crude a method as scooping the secretions from the vagina into a sterile test-tube. It is amazing to find that, upon standing, this material

separates into a serum-colored liquid and a flocculated sediment simulating a white blood-clot which upon microscopical examination will prove to be leucocytes. The inhibitory action on the bacterial flora of the artificially induced uterine secretions is the big factor in overcoming the uterine infection. After the infection has so been removed from the uterus, it is thought well to permit endometrium regeneration to take place. We fixed the required length of time as five to six weeks, because we find that then the uterine secretions are again normal, and rectal palpations of the genital tract reveal normal texture and size.

THOROUGHNESS OF TREATMENT THE SECRET

If, at the end of this time, a catheterization of the uterus were to be made, we would find in practically all cases that instead of having a flocculent or flaky return flow, evidence of chronic pyo-endometritis, we now have an absolutely clear return flow which is the mark for which we strive. Breeding these animals at their second estrual period after the treatment or at any time desired after six weeks, will result in a higher percentage of conceptions than I was able to accomplish with very diligent care and treatment with the intermittent Albrechtsen type. This higher percentage of cures is probably due to the more completeness of this treatment in removing the superficial and deep-seated infections from the genital tract.

Naturally, where endometritis is complicated with ovarian pathology, we should not assume that removal of the infection within the uterus is going to overcome the ovarian disturbance. However, probably treating the pathological conditions of the ovaries and cervix will yield better results when the uterus is free from infection than when it is a source of infection for these accessory organs, and in my practice I have treated these conditions simultaneously with the installation of the instruments at the time of the treatment.

Some of the things to be careful about in this work are:

1. Do not apply the treatment to a uterus that is abnormally large. By that I mean one that would contain as much as a pint or quart of fluid. In a case of this kind, apply your efforts towards reducing the size of the uterus which will usually follow the induction of estrum by removal of a retained corpus luteum. After the organ has attained approximately normal size, then apply the sterilizing treatment.
2. It is always well, after the installation of a catheter, to make a rectal palpation of the structure so as to make sure that

the instrument is in the proper location, and is not perforating the uterus, which would permit the fluid to enter the peritoneal cavity. Even with the best of caution, a condition of this kind sometimes ensues but aside from slight colicky symptoms of the animals, nothing dangerous has been observed. The attendants are instructed that should an animal show colicky pains to discontinue the treatment. Following such mishap, extensive adhesions may develop, but I have seen fully half of these recover of their own accord, and conceive.

Lastly, do not make the mistake of thinking that, because sodium hypochlorite solution dissolves necrosed tissues and controls infection, this would be an ideal type of treatment for retained placenta. The large quantity of fluid retards uterine involution and the absorption of such large quantities of sodium hypochlorite from the subinvolved uterus will promote peritonitis and death. On the other hand, when applied to the uterus after it has involuted to approximately normal size, there is absolutely no danger of this consequence.

Canada Develops the Catalo

In an attempt to provide a sturdy type of cattle to withstand the cold of the western Canadian winters and to find its own forage in the winter, Canadian scientists have cross-bred domestic cattle with buffalo. This new animal, which is called the catalo, is now thriving on the western plains.

The cross-breeding of the two species was started a few years ago, according to *Our Dumb Animals*. Difficulties were encountered, and it was found to be necessary to find an intermediary animal, as the offspring from the cow and the buffalo frequently died at birth. The yak, from Siberia, was chosen, and cross-bred with the domestic cattle. The hybrid from this union was then crossed with the buffalo, and the result is a sturdy animal with heavy, thick hair and a greater percentage of meat on its back than ordinary cattle.

When enough of these animals have been produced, they will be sent to various farms in the northern fringes of the western provinces—to supply milk and meat, and to make up for the loss of the great buffalo herds that are now practically extinct.

**12th International Veterinary Congress
New York—August 13-18, 1934**

SOME STUDIES OF INFECTIOUS LARYNGO- TRACHEITIS*

A Preliminary Report

By C. A. BRANDLY, *Manhattan, Kan.*

Kansas State College

Observations on the fertility and hatchability of eggs from actively infected or laryngotracheitis "carrier" birds have not been encountered in the literature. However, data collected by Hinshaw^{1, 2} reveal that the disease may greatly reduce egg-production and cause heavy mortality in chickens of practically all ages.

During the past year some field observations made possible a comparison between fertility and hatchability of eggs from pens harboring carriers and from pens free of the infection as determined by the tracheal swab method. The percentage of fertility of the eggs from the carrier and non-carrier pens was very similar, while the hatchability of the carrier groups of eggs was considerably lower than that of the non-carrier group.³ These observations were made on carrier and non-carrier groups of birds which had been reared together and had passed through the outbreak as a flock unit before separation. Since trap-nesting was not practiced, the possible influence of the carrier state in lowering the individual vitality or of other influences on the viability of the embryo and subsequent hatchability of the chick could not be determined.

The rapidly deleterious effects of higher temperatures and moisture upon the viability of the incitant of laryngotracheitis were demonstrated by Gibbs.^{4, 5} Therefore, it did not seem probable that the reduction in hatchability was due directly to the presence or influence of the virus in the egg. Furthermore, in view of Gibbs' results, it would not seem probable that the virus could long survive the conditions of temperature and moisture to which the egg is exposed during incubation. Komarov and Beaudette⁶ reported negative results in tests to determine the presence of virus in the ovaries of birds during the incubation period or at the height of the disease, thus further mitigating against the possibility of the virus being resident in the eggs.

To determine the period of viability of laryngotracheitis virus in the egg-yolk and the effect which it might produce when in-

*Contribution No. 156 from the Department of Bacteriology, Kansas State College. Presented at the seventieth annual meeting of the American Veterinary Medical Association, Chicago, Ill., August 14-18, 1933.

oculated into eggs containing 10-day-old embryos a series of experiments was instituted.

EXPERIMENTAL

Preliminary experiments were made to determine how long active or infective filtrates of fresh virus suspensions would retain their viability at egg-incubation temperatures. Since proof of viability of the so-called "filtrable virus" disease agents is established by demonstrating their infective capacity, or infectivity, all determinations of viability were made by intratracheal injections of suspected material into susceptible chickens.

Infective filtrates were prepared by subjecting suspensions of fresh tracheal exudates (1:300 from typical acute cases of laryngotracheitis to filtration through Berkefeld N and V candles at a negative pressure of 40 cm of mercury. The Berkefeld candles had been tested by the water-flow method of Ward and Tang.⁷ The $2\frac{1}{2} \times \frac{5}{8}$ -inch, N-grade filters employed passed from 48 to 64 cc of water in five minutes under a negative pressure of 10 cm of mercury and the same size V-grade filters passed from 72 to 83 cc.

The vehicles used for suspending the tracheal exudate were sterile hormone broth with a pH of 7.0 to 7.2 and aqueous extracts of yeast.* The freshly collected exudates were finely ground with sand in a sterile mortar and the trituration continued during the process of gradually adding the suspending fluid. Before filtering, the suspensions were held in the ice-box (8°C.) for one to three hours and then were centrifuged at 2,000 r.p.m. for 30 minutes.

Each lot of filtrate was tested for sterility by inoculation of freshly prepared plain and hemolyzed blood broth or nutrient agar. Those lots of filtrate failing to give growth at the end of seven to ten days were tested for capacity to infect previously unexposed 4- to 6-week-old chickens. Portions of the active virus filtrates showing a satisfactory potency (having infective dosages of 0.1 cc or less) then were placed in rubber-stoppered test-tubes at 38°C. with and without previous admixture with an equal volume of fresh sterile egg-yolk. At intervals following exposure to 38°C. a sample, representing 0.25 cc of the virus suspension, was taken from each tube and introduced intratracheally into each of two susceptible chickens. In table I are recorded the results obtained in tests with several lots of filtrates.

*Yeast extract was prepared by adding 1 part fresh compressed yeast to nine parts of distilled water, infusing the suspension in the ice-chest for 4 to 12 hours and then centrifuging at 2,000 r.p.m. for 30 minutes. The supernatant fluid is used as the "yeast extract."

TABLE I—*Viability of filtered virus at 38°C.*

FIL- TRATE	GRADE FILTER	SUSPENDING FLUID	INFECTIVITY AFTER INCUBATION										
			INCUBATION PERIOD (HOURS)										
			½	1½	4	8	24	36	48	60	72	84	
13	V	Broth—with yolk	+	+	+	+	+	+	+	+	+	—	
		Broth—without yolk	+	+	+	+	—	—	—	—	—	—	
2-3	N	Broth—with yolk	+	+	+	+	—	—	—	—	—	—	
		Broth—without yolk	+	+	+	—	—	—	—	—	—	—	
11	V	Broth—with yolk	+	+	+	+	+	—	+	—	—	—	
		Broth—without yolk	+	+	+	+	—	—	—	—	—	—	

+ = Production of typical disease picture in one or both of two inoculated chickens.

— = Failure to produce infection.

The results of this experiment support the observation that the virus rapidly loses its viability upon storage in a moist state at temperatures to which the egg is subjected during incubation. However, the egg-yolk appears to exert some protective action against loss of infectivity at temperatures of incubation and thus a possible harmful effect on the embryo within the shell, operating during early incubation, cannot be excluded.

In previous studies⁸ it was found that the washings of fresh, clean eggs dipped into virus suspension were not infective after 12 hours at 38°C. Failure to demonstrate virus on the egg from carrier flocks and from flocks suffering from an active attack of the disease indicated the improbability of transmission of the infection on the egg surface.

INTRODUCTION OF VIRUS INTO THE EGG-YOLK

In considering exposure of the embryo to the infection the operation described by Bouges⁹ suggested itself as a safe and satisfactory means of introducing the virus into the proximity of the embryo as early as possible after the beginning of the incubation period. The anatomical development precludes the possibility of puncturing the limiting membrane of the yolk before the seventh day of incubation without fatal injury to the embryo. Furthermore, it is stated that the volume of albumen of the egg may not be successfully altered, although the yolk substance may be increased or diminished to some extent, without great danger of harm to the 8- to 15-day-old embryo.

The technic of the operation as originally described by Bouges was followed in detail. In preliminary instillations of materials

into the yolk it was found possible to introduce quantities of saline greater than 0.5 cc without apparently influencing the subsequent development of the 8- to 10-day embryo.

Two lots of 150 eggs each from a breeding flock of Rhode Island Red hens and pullets with no history of exposure to laryngotracheitis were used in the experiment. A pullorum disease control program including blood-testing had been in operation in the flock for several seasons and the latest test showed about 4 per cent reactors. The factor of a reduction in hatchability and fertility produced by pullorum disease should, therefore, not have been significant. Bacteriological examination of the eggs which did not hatch showed only a low percentage of pullorum infection.

Each lot of eggs was incubated in a 150-egg electric incubator of commercial manufacture. Satisfactory and uniform temperature and atmospheric conditions were maintained throughout the incubation period. The eggs were turned four times daily until the 18th day, the position of the tray being reversed at each turning. The eggs were candled on the tenth day and those containing living embryos were divided at random into three groups. The yolks of one group were inoculated with 0.25 to 0.5 cc of fresh virus suspension filtrate prepared as described in the experiment on viability. The second lot was injected with an equal quantity of the hormone broth used for suspending the virus. The third lot of eggs served as a control on the possible injury resulting from the operation.

The hatchability of the uninoculated and the broth inoculated eggs, although almost identical, was so low in the first lot of eggs that the results were not considered significant. Nevertheless, there appeared to be a tendency toward a difference in hatchability of the uninoculated and inoculated eggs similar to that observed with eggs from "non-carrier" and "carrier" pens of hens.

The second lot of eggs was relatively low in fertility as well as hatchability but the results recorded in table II seem to be significant. Of the 150 eggs set, 98 contained living embryos on the tenth day. These were separated into four lots.

Gross examination of the contents of the unhatched eggs revealed chicks in various stages of development, some in each group having apparently succumbed immediately following inoculation. However, it seemed significant that the estimated average age at which the uninoculated chicks succumbed was 17 days, while the inoculated group (both virus and broth) showed

TABLE II—Effect of laryngotracheitis virus inoculation on the hatchability of eggs.

LOT	FERTILE EGGS	TREATMENT	CHICKS HATCHED	
			NO.	PER CENT
1	32	None	17	53.1
2	32	Injected with broth	17	53.1
3	18	Injected with virus I	4	22.2
4	16	Injected with virus II	0	0.0

an average age of 13 days at death. These findings suggest that the injury produced by the virus was not so significant as the recorded differences in hatching indicate and that the apparent similarity between the broth inoculated and uninoculated groups might not be demonstrable if a greater number of eggs were hatched.

Those chicks which hatched were held under observation for a period of three weeks. No evidence of laryngotracheitis was observed in any of the birds although one chick from each of the broth-inoculated and uninoculated lots died. *Salmonella pullorum* was isolated from each chick.

Bacteriological examination of the unhatched eggs revealed the presence of *S. pullorum* in two of the virus-inoculated lot of eggs and in one of the uninoculated group.

On the 23rd day after the incubation was begun, yolk material was collected from some of the eggs of each lot which failed to hatch. Some of the pooled yolk and tissue material from each lot was inoculated into susceptible chickens. None of these birds developed any evidence of laryngotracheitis during a subsequent observation period of three weeks.

IMMUNE SERUM

The work of Beach¹⁰ on the neutralization of the virus of infectious laryngotracheitis with the serum of recovered birds suggested the utilization of the serum to prevent or ameliorate the symptoms in birds exposed to the infection.

A group of eight carrier birds obtained from two flocks recently affected with the disease were inoculated intratracheally with massive doses of virus suspensions in the hope of enhancing the antiviral properties of the blood. At the time of inoculation, two months after occurrence of the outbreaks, two of the birds were still manifesting tracheal râles. From two days to two weeks after inoculation, all of the fowls showed more or less evi-

dence of respiratory distress, in the form of sneezing and occasional "gasping," but none succumbed. Although two additional birds were showing tracheal râles 22 days after inoculation the entire lot was bled and the serum separated and pooled. That not used immediately was treated with "merthiolate" to make a 1:5,000 solution and stored in the ice-box.

Preliminary tests to determine the neutralizing activity of the immune serum upon virus suspensions showed considerable variation in results. That the variation was to a large extent due to a difference in susceptibility of the different lots of birds employed seemed to be indicated by the results obtained in another series of experiments.

In the preliminary titrations of the neutralizing action, constant volumes of immune serum were mixed respectively with 1, 2, 3, 4 and 5 times their volume of virus suspensions (1:300). These mixtures were injected intratracheally into susceptible birds within one hour after mixing. The virus suspensions rep-

TABLE III—Neutralization of virus by immune serum.

	SERUM (cc)	VIRUS (cc)	BIRDS	RESULTS
Experiment 1	0.1	0.1	2	Normal 21st day
	0.1	0.2	2	Normal 21st day
	0.1	0.3	2	Normal 21st day
	0.1	0.4	2	One showed typical laryngotracheitis symptoms 14 days after inoculation; dead 17th day. Other bird normal
	0.1	0.5	2	Both showed typical laryngotracheitis symptoms 13 days; died 16th day
	0.1	...	2	Normal
	...	0.1	2	Symptoms of laryngotracheitis on 3rd and 4th day; one dead on 5th, other on 6th
Experiment 2	0.1	0.1	2	One normal; other typical symptoms 11th day; died 14th
	0.1	0.2	3	Two normal; one showed typical symptoms
	0.1	0.3	2	Normal
	0.1	0.4	2	Symptoms on 10th day; died 12th and 13th days
	0.1	0.5	3	All typical symptoms 9-10th day; dead 11th and 13th days
	0.1	...	2	Normal
	...	0.1	2	Symptoms 3rd and 4th day; dead 5th and 7th days

resented, as determined by dilution, approximately 10 infective doses in each part or unit of 0.1 cc. The results of these tests are summarized in table III.

EFFECT OF SERUM ON INOCULATED FOWLS

To determine how long after the inoculation of virus the administration of immune serum still would be effective in preventing or ameliorating the symptoms of laryngotracheitis, a group of 16 fowls was inoculated with 10 to 20 (0.1 to 0.2 cc) infective doses of virus by the intratracheal route. At 2, 4, 7, 12, 24, 36, 44, and 60 hours respectively, two birds were treated with 0.5 to 1.0 cc of immune serum introduced into the trachea. One of the two birds treated with serum four hours after inoculation with virus showed mild symptoms of laryngotracheitis as manifested by sneezing and slight dyspnea on the eighth day. This bird made a complete recovery within three days. One of the fowls given serum at the 44th hour developed typical symptoms of the disease on the eighth day and died on the ninth. Typical lesions were present. No more cases developed up to and including the 20th day.

The data in table III show that the serum of carrier birds from a natural outbreak, later inoculated with massive doses of virus, possessed a high degree of activity in neutralizing the virus. The immune serum seems to exert only a temporary protection, perhaps local in character, as indicated by the fact that fowls treated with non-infective virus-serum mixtures are later susceptible to infection. That immune serum administered as late as 44 hours following exposure by inoculation prevented or delayed the appearance of the disease may indicate the successful application of this treatment in naturally exposed flocks.

SUMMARY

1. The virus of infectious laryngotracheitis within or upon the surface of the egg does not seem to survive, except for short periods, in the environment to which the hen's egg is subjected during incubation.
2. The spread of laryngotracheitis virus by way of the eggs from infected or carrier hens would, therefore, not seem to be important.
3. The development of normal chicks from infected or carrier flocks as well as from eggs artificially inoculated on the tenth day of incubation further indicates that the danger of infection *via* the egg is not significant.

4. The results of the inoculations of eggs incubated for ten days support the field observations that laryngotracheitis infection in a flock may directly or indirectly reduce the hatchability. Further critical investigations of this problem are planned.

5. The method and technic of Bouges for modifying the embryonic nourishment of the chick may be adapted to the study of the effect of disease infection upon the embryo.

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A Strange Accident

A large oil company played veterinarian to a bird dog recently, by putting its chemical laboratories to work to extract the animal from a large cake of asphalt in which it had become embedded. CWA workmen found the dog in a sewer trap, moaning piteously, with all but its eyes and nose submerged in the asphalt. They carried it to the chief chemist at the laboratories, who, with his helpers, began bathing the dog in lubricating oil and kerosene, slowly diluting and removing the huge mass from the dog's body. The process was alternated with baths in soap and water. Finally, in the evening, the dog received its last bath and was free again. After a night spent in sleep in the laboratories, it was apparently a normal, happy dog once more.

American Field.

**12th International Veterinary Congress
New York—August 13-18, 1934**

A PRELIMINARY REPORT ON TRICHOMONIASIS OF PIGEONS*

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Diseases of birds are becoming of greater importance each year. Pigeons are not of insignificant value or of unnoticeable economic importance. The pigeon "fancier" is a part of our purebred industry. The homing pigeon enthusiast lives in most localities and his hobby has practical value. Squab-raising is a considerable commercial industry. Veterinarians should be thoroughly informed about the diseases of this group as well as of our domestic fowls. Infections due to protozoa are not so common as bacterial diseases among the animal population of this country. Some, however, are of great economic importance, *i. e.*, Texas fever. Some of the other more common protozoan diseases in the United States are coccidiosis, anaplasmosis, dourine, and bird malaria. In addition there are several others that occur in rodents and reptiles and a few that occur rarely in our domestic animals and birds. Only recently there appeared in the literature of this country reports of trichomonad infections of the genital tract of cattle. This condition has been known to exist in Europe for several years.

The presence of protozoa in the alimentary tract of wild and domestic birds has been shown by various investigators. Hadley¹ at one time attempted to prove that blackhead of turkeys was due to a trichomonad infection, but later workers have proven the disease to be caused by an organism belonging to the genus *Histomonas*. There is very little in the literature regarding a pathogenic protozoan infection due to trichomonads in pigeons. As far as we know, it has never been reported from North America.

This disease first came to our attention, June 29, 1932. Two dead squabs of approximately three weeks of age were brought to the diagnosis laboratory with the following history: They had been sick from five to seven days and were emaciated, the feathers were dry and rough, and they had shown a severe sulfur-colored diarrhea. The birds were not nest-mates. They had been dead for about 24 hours and had been chilled in order

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to preserve them until they could be examined. An autopsy revealed the presence of numerous necrotic areas of varying sizes in a highly congested liver and pancreas. There were also about 10 cc of sero-sanguinous fluid in the peritoneal cavity. The duodenum was filled with hemorrhagic mucus. Smears made from the duodenal contents and hepatic lesions failed to reveal the presence of any protozoa. Bacteriological examinations were negative. About two months later, a live, sick squab was secured from the same loft. This bird was very emaciated, weak, and had a marked diarrhea. Smears made of fresh fecal material showed a motile flagellate. This squab was destroyed and autopsy lesions, similar to those just described, were found. We were able to demonstrate the presence of the flagellate in both the necrotic foci and the peritoneal fluid. Bacteriological findings again were negative.

During the past year, we have examined 13 naturally infected birds, all showing similar lesions, which varied only in severity and amount of tissue involved. Two of this group showed protozoan peritonitis, pericarditis and pneumonia. After studying both fresh and stained smears, it was determined that these unicellular structures belonged to genus *Trichomonas*.

Phylum—Protozoa

Sub-phylum—Plasmodioma

Class—Mastigophora

Sub-class—Zoomastigina

Order—Protomonadida

Sub-order—Eumonadea

Family—Trichomonadidae

Genus—*Trichomonas**

REVIEW OF LITERATURE

This disease of pigeons was first reported and described in 1878 by Rivolta,³ of Italy. No further record was found until 1907, when Jowett⁴ reported it occurring in South Africa. Von Ratz,⁵ of Hungary, in 1913, Waterman,⁶ from the West Indies, in 1919, Heelsbergen,⁷ from Holland, in 1925, and lastly Bos,⁸⁻⁹ also of Holland, in 1932, described the infection. This condition has been reported seven times and in six different countries.

The organism as reported by Rivolta and Jowett was called *Cercomonas hepaticum*. Their descriptions were inadequate and not complete. The first detailed description was made by Von Ratz and the organism was named by him *Trichomonas columbae*.

*Classification according to Wenyon.²

VITAL MORPHOLOGY

We have not stressed the study of morphological details in this preliminary work. Such work will be carried out and presented at a later date. The trichomonads as observed from the lesions produced are pear-shaped and are approximately the size of a leucocyte. The organisms found in the blood-stream and observed in cultures are spherical or nearly so. They have three anterior flagella that are slightly longer than the body. There is also an undulating membrane that originates from the blepharoplast and extends the full length of the body. In the pear-shaped organisms the marginal filament of the undulating membrane continues posteriorly to form the posterior flagellum. The presence of the axostyle is very difficult to demonstrate. It may be seen in the spherical forms that are undergoing simple division. Motility is manifested in one of two ways; *i. e.*, either by a lashing movement of the flagella or by a spiral movement of the body. Multiple fission as well as binary fission may occur.

PATHOLOGY

Grossly the hepatic lesions were the most marked. The liver was enlarged and congested. The lesions appeared as yellowish-cream-colored areas slightly sunken below the surface of the organ. They vary in size from microscopic to approximately one inch in diameter and do not have a definite border. There is a gradual change from necrotic tissue to normal. Microscopically the lesion is made up of trichomonads, leucocytes, and dead hepatic tissue. The only lesions in which bacteria were encountered were those found in birds that had been dead for several hours previous to examination.

The pancreatic lesions are essentially the same as those observed in the liver except that the larger lesions show a marked tendency to become walled off.

The lesions observed in the peritoneum have the appearance of a suppurating ulcer.

The lesions in the lungs are sunken below the surface, are darker in color than the hepatic lesions, and are more fluid. The pulmonary lesions usually contain bacteria.

Pericarditis observed in one bird was manifested by a distension of the pericardial sac with flocculent serum containing leucocytes and trichomonads.

The fluid observed in the peritoneal cavity was sero-sanguinous and contained myriads of flagellates and blood-cells.

EXPERIMENTAL RESULTS

Work was started on this problem first in the fall of 1932. The only pigeons available were those secured from the market. A group of these, nine in number, was fed a suspension of diseased liver in physiological saline solution. Routine fecal examinations were made and found to be negative for motile trichomonads. These nine birds and two controls were kept under observation for two months. One pair mated and hatched two young. One of these died when 24 hours old and the other at 48 hours. An examination of the mucus and food found in the crops of the two squabs showed many trichomonads. After considering the method used by the old pigeons in feeding their young, it was decided to examine the crop contents of the parent stock. This was carried out on the nine inoculated and two control birds. Sixteen additional birds were secured and also examined. Only three of these 27 birds were negative and these three were birds that had been inoculated with a suspension of protozoa that were no longer motile. Birds from eight different lofts were examined and the infection was present in all.

The organism from the crop is morphologically identical with the ones found in the lesions of the liver and pancreas. Since it was impossible to obtain squabs at that time of the year, it was decided that we would try to infect baby chicks. An infected pigeon was removed from feed and water for 24 hours and then the crop contents were washed out by injecting and withdrawing small amounts of warm physiological saline solution with a small rubber tube. This material, containing many trichomonads, was used to inoculate the chicks. In each group of six chicks, two were fed *per os*, two were injected *per rectum* and two were kept as controls. This was tried on three different groups of chicks and all were destroyed in from three to five days after inoculation. Trichomonads were not found in the alimentary tract of these 18 chicks.

Two dead squabs of approximately two weeks of age were obtained on April 24, 1933, from the loft in which the infection had occurred the previous year. These birds presented lesions similar to those previously described, varying only in degree of severity. A part of the infected liver was emulsified in sterile normal saline solution and four young squabs inoculated. Squab 1594 received 1 cc intravenously. Squabs 1598 and 1597 each received 1 cc directly into the liver, injected by a 20-gauge hypodermic needle. Squab 258 received 15 cc directly into the crop.

Five days later (April 30), squabs 1597 and 1598 were found dead.

Autopsy of squab 1597 showed the lobe of the liver that received the injection greatly enlarged and containing typical trichomonad lesions. The other hepatic lobe was mottled with grayish-white areas that proved to be developing lesions. The pancreas showed numerous small lesions. There was also a slight suppurative pericarditis. Trichomonads could be demonstrated in all the above lesions as well as in the peritoneal fluid which was increased in amount. Autopsy findings in squab 1598 were essentially the same as those of squab 1597, with the addition of lesions appearing in the lung and peritoneum. Bacteriological examinations were negative in both birds. An emulsion was made from the liver of squab 1598 and 1 cc injected into the liver of squab 2016 on April 30, 1933. Squab 2016 was found dead in the nest on May 6, 1933. It had been dead for several hours. The autopsy showed lesions similar to those previously described. Due to the fact that it had been dead over night the number of motile flagellates was few.

Three birds were inoculated intrahepatically with a liver-saline suspension from squab 2016 but all were found dead 24 hours later. The material injected was more or less decomposed and the birds died as a result of the injection of this toxic material. Squab 1594, which was injected intravenously on April 24, developed a large swelling on the injected wing and was emaciated when examined on May 8, 1933. The bird became weak and was destroyed, May 14, 1933. The only gross lesion observed was the swelling of the humeral region of the wing. The skin over this area was incised. A sero-sanguinous fluid mixed with gas bubbles was obtained. This fluid contained numerous trichomonads and blood-cells. The muscle over the humerus was cut away, exposing a subperiosteal abscess that completely surrounded the bone and involved the joint cavity at the proximal end of the shaft. When the humerus was removed it was found that the bone-marrow had been replaced by the same type of necrotic material that was found in the subperiosteal abscess. This contained many trichomonads. The necrotic material from the abscess and the fluid collected from the swelling were diluted with sterile saline and injected intrahepatically into squabs 610 and 613, each bird receiving 1 cc.

On May 21, squab 613 was found dead in its nest. Autopsy revealed lesions typical of trichomoniasis. No young pigeons were available for inoculation from this bird.

Squab 258 was fed 15 cc of a liver suspension on April 24, and was found dead on June 11, 1933. This bird had become very weak and emaciated, the feathers were rough and dry, and there was a profuse sulfur-colored diarrhea. The autopsy lesions were the most extensive of any found.

Necrotic material from the liver lesions, purulent material from the pericardial sac, and peritoneal fluid from squab 258 were mixed, diluted with 10 cc of Locke-serum medium and used to inoculate three squabs. Squab 615 received 1 cc intrahepatically. Squab 610, which had been used before but had not died, was fed 16 cc. Squab 616 was fed 5 cc. Squab 617 three days old, was fed 0.5 cc of peritoneal fluid. Evidently this was administered by way of the trachea instead of the esophagus, as the bird died of pneumonia within 48 hours. Squab 610 died on June 20, 1933, and squab 615 died three days later. Autopsy lesions were typical of trichomoniasis. No susceptible squabs were available for inoculation from these two birds. Squab 616 was alive and apparently healthy, July 23, 1933.

ARTIFICIAL CULTIVATION

Various media have been tried in the cultivation of this organism. A modified Locke's solution, combined with Loeffler's dehydrated blood-serum, gave the best results. The ingredients and method of preparing it are as follows:

Sodium chlorid	9.00 grams
Calcium chlorid20 grams
Potassium chlorid40 grams
Sodium bicarbonate20 grams
Dextrose	2.50 grams
Distilled water q. s.	2,000 cc

This is autoclaved at 15 pounds for 15 minutes. After it has cooled, 5 grams of Loeffler's dehydrated blood-serum is added. The dehydrated blood-serum consists of:

Blood-serum	3 parts
Dextrose broth	1 part

The medium is tubed immediately and stored in the refrigerator. All glassware is sterilized and the medium handled under sterile precautions. The amount of contamination is not great. In the earlier work this medium was passed through a Berkefeld V filter, but such medium after filtration would not produce so heavy a growth of trichomonads as the unfiltered medium. The presence of *Eschericia coli* and *Bacillus subtilis* in the cultures

was not detrimental to the trichomonads if transfers were made every 24 hours. The presence of staphylococci would destroy trichomonads within 72 to 96 hours. The method of transferring cultures was to draw off the medium by means of suction, leaving only the sediment. To this sediment is added a new tube of medium. This procedure removes the majority of the motile bacteria and leaves most of the trichomonads.

Inoculation of squabs from cultures have been very unsatisfactory. We have succeeded in killing only one bird out of three by injecting culture sediment and in this bird the lesions contained great numbers of *E. coli*.

CONCLUSIONS

1. A disease of squabs due to trichomonads, that has not previously been reported from America, has been observed in two lofts of homing pigeons in the vicinity of University Farm.
2. The condition is manifested by the development of necrotic areas in the liver, pancreas, peritoneum, pericardium and lungs.
3. Mature birds have been found resistant to natural infection.
4. Since the disease has been transmitted by feeding the organism to susceptible birds, the probability of an intermediate host has been practically eliminated.

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DISCUSSION

DR. I. D. WILSON: I am very much interested in this paper. In 1929, I was doing some work with Dr. Becker at the Iowa State College and we observed trichomoniasis. In this particular outbreak, we observed that there were a large number of losses among the adult birds. The lesions we observed were found in the liver very much as you have described them. I suspect this disease is quite widely distributed.

DR. R. FENSTERMACHER: Dr. Waller's findings do not quite confirm your statement. It seems that the heaviest losses occurred before the birds were 24 to 30 days old, and after that the losses were materially reduced. As far as distribution is concerned, we have our share of pigeons at University Farm, probably more than we need, and poison was placed to obtain some of the pigeons. I don't remember the number that we collected but all were found to be carrying the same protozoön in their crops. They were all adult birds.

THE USE OF VARIOUS AGENTS IN AN ATTEMPT TO INFLUENCE THE BRUCELLA AGGLUTININ CONTENT OF THE BLOOD*

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During recent years, the diagnosis of Bang's disease has rested in a large measure upon the agglutination test and at this time both the rapid method and the tube method are recognized as official and accurate diagnostic agents.

It is the hope of many students of Bang's disease that a drug, chemical or biological agent will eventually be discovered that will lower the agglutinin content of the blood of cattle. An endeavor to find such an agent and the results of such efforts are briefly outlined in this paper.

Formalin: Formalin was used per os, in 1924, in an attempt to clear the Brucella-infected udders of several cows but with negative results.

In 1931, repeated dram doses of formalin were given subcutaneously to reacting cattle in an attempt to lower the agglutination titre of the blood. This method failed, as did also formalin injected intravenously. No appreciable lowering of the agglutinin titre was noted during the ten months of the experiment.

Flavines: Edwards and Coffman,¹ in 1926, made a very encouraging report upon the flavine dyes as a promising treatment for Bang-infected cattle. This report stimulated work in 1926 and 1927 with acriflavine and proflavine upon three series of rabbits. The results did not justify an experiment upon larger animals. James and Graham² found no indication of any curative properties possessed by this dye during the course of treatment after an interval of six months in infected cows. Huddleson³ reported negative results following the use of the flavines in two cows.

Metaphen: Metaphen was used, in the spring of 1927, upon 12 female rabbits and two cows. The rabbits received three injections each of saline-washed Brucella organisms and in each instance responded in diagnostic titre in dilution of 1:5,000 or higher. The cows were from a Bang-infected herd. One of the cows aborted four months before this experiment was started.

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The rabbits were given three doses of metaphen intravenously at three-day intervals. No harmful effects produced by this product against *Brucella* were noted over an eight-month period.

Two rabbits died at this time, one of which yielded *Brucella abortus* from the viscera and the other rabbit was negative for *Brucella* on culture. At the end of 12 months, the ten remaining rabbits were still reactors in dilution of 1:200 or higher.

The cows were given three injections of metaphen intravenously, at weekly intervals, consisting of 20, 40 and 60 cc of a 1:500 solution. During and at the end of a full year no beneficial effects of this product upon *Brucella*-infected cows could be noted and no harmful effects were observed during the course of treatment.

James and Graham⁴ reported a similar experience with this product on cows suffering from Bang's disease.

Guaiacol: Guaiacol was used on a series of 12 female rabbits and two cows. The rabbits were reactors following triple injections of live *Brucella* organisms. For the eight months of the experiment none of these rabbits lost their positive reaction in diagnostic titre.

Two reacting cows received three grams of guaiacol suspended in 30 cc of water twice daily for five days, or a total of 30 grams. The injections were given intravenously. Table I shows the details and result of this experiment.

It is interesting to note that both of these cows dropped normal calves about three months after the last injection and that both calves remained healthy. They were slaughtered for veal at the age of two months.

The placenta from each cow yielded pure cultures of *Br. abortus* and in neither case was the placenta retained longer than four hours.

Composite milk samples from each cow yielded *Br. abortus*, and the feces of the calf of cow 1 also was cultured for *Br. abortus* with positive results.

Azamine: Azamine recently has come into prominence for its bactericidal action in mastitis. It was decided to check up the effect of this azo dye upon *Brucella*-infected cattle, and two cows and a bull were obtained for the experiment. All of these animals were reactors to the agglutination test. Three hundred cc of a solution containing 24 grains of azamine was injected intravenously every other day for two weeks, or a total of 168 grains per animal. No harmful effects were noted and after eight months no beneficial effects of the product as a treatment

TABLE I—*Guaiacol experiment.*

Cow	PRELIMINARY BLOOD TITRE	INTRAVENOUS INJECTIONS	MAXIMUM TEMPERATURE	CALVING RECORD	BRUCELLA ABORTUS CULTURE			BLOOD TITRE 12 MONTHS AFTER LAST INJECTION	BREEDING CONDITION 5-15-33	MILK TITRE 5-15-33
					MILK	PLACENTA	CALF FECES			
1	1:4,000	30 gm. in 5 days	101.9°	Healthy calf 90 days later	+	+	+	1:1,000	Pregnant about 8 months	1:200
2	1:2,000	30 gm. in 5 days	101.7°	Healthy calf 105 days later	+	+	—	1:2,000	Pregnant about 3½ months	Not lactating

TABLE II—*Azamine experiment.*

ANIMAL	PRELIMINARY BLOOD TITRE	INTRAVENOUS INJECTIONS	HIGHEST TEMPERATURE RISE	BLOOD TITRE		
				30 DAYS LATER	6 MONTHS LATER	8 MONTHS LATER
Cow 3	1:1,000	168 grs. in 14 days	0.5°	1:1,000	1:200	1:200
Cow 4	1:400	168 grs. in 14 days	0.7°	1:400	1:400	1:400
Bull	1:200	168 grs. in 14 days	0.9°	1:200	1:100	1:100

for *Brucella*-infected cattle were apparent. Table II gives the details and results of this experiment.

Massive Brucella abortus bacterin injections: The opinion has been expressed by certain individuals that abortion reactors will lose their diagnostic titre following the injections of large doses of bacterin intravenously. Two cows were available as likely subjects to test out this statement, particularly because the history for the preceding three years was known and, further, both cows had been blood reactors for three years.

Four strains of *Br. abortus* were mixed in equal amounts and standardized to 10 mm by the Gates method. They were heat-killed and autolyzed and phenol was added as a preservative. Three injections were made at weekly intervals into the jugular vein and the temperatures recorded every two hours until they returned to normal. From two and one-half to four days were required and all the clinical phenomena attendant to a high temperature were observed following each injection. Table III records the details of this experiment.

Interagglutinability studies: Mallmann⁵ stated that *Brucella*-immune rabbit sera were found to agglutinate *Pasteurella* and *Pfeiferella* antigens, and *Pasteurella*- and *Pfeiferella*-immune rabbit sera would agglutinate *Brucella* antigen. Kinsley⁶ stated that other protein reactions may interfere with the Bang agglutination test, naming hemorrhagic septicemia as a specific instance.

These conclusions, if true, would mean that cattle free of Bang's disease might be culled because of a previous vaccination with a hemorrhagic septicemia product in error for *Brucella* infection.

In order to throw some light upon this question two *Brucella*-free heifers were purchased and kept under observation for 30 days. Weekly blood-tests were made during this period.

One heifer was injected with 5 cc of a hemorrhagic septicemia bacterin and the other heifer 25 cc of the same product. This bacterin was purchased on the market. Thirty days after the first injection, the dosage was switched and the animals re-vaccinated. Table IV shows the details and result of this experiment.

Dr. S. J. Schilling, of the Jen-Sal Laboratories, kindly sent me eleven *Pasteurella*-hyperimmune horse sera which tested negative against *Brucella* antigen.

TABLE III—*Massive bacterin injections.*

Cow	PRELIM- INARY BLOOD TITRE	PRELIM- INARY TEMPER- ATURE	FIRST INJECTION	HIGHEST TEMPER- ATURE	SECOND INJECTION	HIGHEST TEMPER- ATURE	THIRD INJECTION	HIGHEST TEMPER- ATURE	BLOOD TITRE 30 DAYS	BLOOD TITRE 12 MONTHS
5	1:800	101.5°	20 cc	105.8°	40 cc	106.2°	60 cc	105.8°	1:20,000	1:400
6	1:400	99.1°	20 cc	104.8°	40 cc	105.6°	60 cc	106.0°	1:10,000	1:400

TABLE IV—*Pasteurella bacterin injections.*

HEIFER	BRUCELLA ANTIGEN	PASTEURELLA ANTIGEN	PASTEURELLA BACTERIN (7-10-31)	30 DAYS LATER		PASTEURELLA BACTERIN (8-10-31)	30 DAYS LATER (9-10-31)	
				BRUCELLA ANTIGEN	PASTEURELLA ANTIGEN		BRUCELLA ANTIGEN	PASTEURELLA ANTIGEN
7	Negative	Negative	5 cc	Negative	1:200	25 cc	Negative	1:400
8	Negative	Negative	25 cc	Negative	1:400	5 cc	Negative	1:400

SUMMARY

1. Intravenous injections of formalin, acriflavine, proflavine, metaphen, guaiacol and azamine were not followed by any observable beneficial effects in *Brucella*-infected animals.

2. Prostration and a high thermal response followed each intravenous injection of massive doses of *Brucella* bacterin in *Brucella*-infected cows. The peak of the thermal response was reached ten hours after the injection and from two and one-half to four days elapsed before the temperature dropped to normal.

3. No *Brucella* agglutinins were demonstrated in the blood of heifers following injections with hemorrhagic septicemia bacterin. These animals became reactors to a hemorrhagic septicemia antigen. No interagglutinability was demonstrated for a *Brucella* antigen following injections with hemorrhagic septicemia bacterin.

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Protecting Wild Life in Montana

An area, covering 240,000 acres of federal land on Sun River, Montana, has been set aside and designated as a primitive area, by F. A. Silcox, chief of the Forest Service, U. S. Department of Agriculture.

The area is said to be unsurpassed in the variety of attractions it offers to sportsmen, naturalists, students of Indian lore and recreationists. Here is the third largest herd of elk in the United States. Mountain sheep and goats make their homes among the limestone cliffs and crags, on which ancient Indian carvings still may be seen. The area is without roads or settlements; instead, it is honeycombed with game trails dating back to the Indians. Within the territory, the Forest Service will neither construct roads nor allow any to be built. It is the intention to keep the area as nearly primitive as may be possible.

SOME SWINE DISEASES AND ATTEMPTS AT CONTROL*

By JAMES W. BENNER,† *Fontana, Calif.*

The permanent hog-lot has long been known to be an unhealthy environment. It is hardly possible to criticize its use too severely. Dangers to health increase with time of use and the number of animals confined. Where permanent lots must be used, the closest attention must be paid to sanitation.

The farmer feeding grain, if he will, can avoid the permanent lot almost entirely by giving his hogs extensive range in fields large enough to cultivate and crop. Many smaller garbage-feeders also practice this method. The garbage is dumped on the ground and feeding locations are changed frequently enough to avoid a high concentration of soil contamination.

In the garbage-plant owned and operated by The Fontana Farms Company, at Fontana, California, 35,000 to 50,000 hogs have been moved in and out of permanent lots annually for over ten years. Fertilizer is an important commercial by-product. Therefore, range and crop rotation have not been practiced to any great extent. The question of vital importance here is: Can and will sanitation be practiced in a strict enough manner to make permanent hog-lots safe?

This brings to mind an incident that once occurred in the theatre. The stupendous production, "The Four Horsemen of the Apocalypse," had just been shown. The movie was followed immediately by a vaudeville act. The first actor on the stage made his appearance with a large shovel on his shoulder and announced to the audience that he was the man who always followed the four horsemen. If permanent hog-lots are to be made safe, it will certainly necessitate a close following of men with shovels plus plenty of action.

The biological complex of a hog in the same habitat with 49,999 others has, in this locality, at least six real dangers threatening health and life. By multiplying 50,000 by 6, the product is 300,000, which is a very conservative figure of the dangers constantly threatening. From observations made during the past seven months, the six most dangerous diseases, named in order of time of occurrence from farrowing on, are (1) acute enteritis of the

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newborn, occurring from two to five days of age; (2) anemia, 18 to 35 days; (3) hog cholera, 28 days on,—I am speaking here of pigs from immune mothers; (4) pneumonia and pleurisy, six weeks to six months; (5) gastro-enteritis, six weeks to six months; (6) infectious abortion, from weaning age on. As said before, this is a conservative figure, for injuries, tuberculosis and parasitic diseases are not included in the list and swine erysipelas, anthrax and the like must always be kept in mind also.

Injuries take a considerable toll, especially if we count the young pigs that are crippled or killed by the sow either stepping or lying on them. Very little tuberculosis has been diagnosed, and of parasitic diseases, mange seems to be about the only one that gives serious trouble. Refuse like tin cans, broken glass, oyster shells, needles, pins, carpet tacks, etc., are always a source of danger in garbage. Chemical poisoning from rat poison, salt brine, or bichlorid tablets, and food poisoning such as botulism, sometimes occur.

Upon arrival at the garbage-plant last November, work was immediately begun to learn what swine diseases were causing losses by both unthriftiness and death. A route of inspection was planned and has been covered almost daily. Each morning autopsies are held on animals which have died the night before and observations made of animals in the pens from which the dead ones have been taken. The data collected in this manner have been the guide in planning a program of disease control.

In the beginning, our main attention was directed to animals over 21 days of age. Deaths among pigs under this age, still in the farrowing-pen, were taken, as is usually the case, more or less as a matter of course, about which little could be done.

THREE-DAY-PIG DISEASE

After about a week or ten days of autopsying the larger animals, exceptionally heavy losses were reported in the farrowing-pens among the pigs two to five days of age. Three days was such a common age for death to occur that in ranch conversation it soon came to be called the "three-day-pig disease."

In the cases we call typical, the pigs observed before death are very weak, show roughened coat, are unsteady on foot, rest the nose on the floor in a stupor bordering on coma, and very frequently have diarrhea. They nurse some but most of them show emaciation at death. The weaker litters suffer most but the disease is by no means limited to the poorer ones.

Autopsies reveal an enteritis of an acute type seldom seen in older animals. The area involved in the cases we call typical begins from ten to 18 inches posterior to the stomach and extends to a point double the distance and sometimes more. This corresponds closely to the anatomical division more or less arbitrarily determined and called the jejunum. The affected intestines show gas bubbles through the wall, which causes one to think that a gas-producing organism must play a part in bringing about the pathological changes. Other parts of the small intestine are rarely involved in this way.

Among those which we classify simply as "cases," the entire small intestine is hyperemic but does not show the hemorrhagic enteritis of the more severe cases. The typical hemorrhages in the wall of the intestine within the limits of the area already mentioned may occur as petechiae, more diffuse hemorrhages which give a mottled appearance, or as a still more hemorrhagic condition which gives the entire intestinal wall a very dark red appearance.

A few cases become chronic and show a necrosis of the diseased area, which finally terminates in a peritonitis with adhesions of both the visceral and parietal peritoneum. Other organs in the gross appear normal. In a considerable number of pigs posted before they have suckled, the tissue changes described have not been found. The stomach and stomach contents of typical cases that die in the acute stage of the disease appear normal.

The loss has ranged from 30 to 60 per cent. Practically the whole of it occurs in from two to five days, with the peak being, as said before, three days after birth. The comparatively few cases which become chronic either die or are killed at from 15 to 21 days of age because of their stunted condition.

Other garbage-plants where losses have been reported have been visited and autopsies held. The same disease has been found. One of these plants reported a 90 per cent loss of the young pig crop which, as well may be imagined, was ruinous to the swine-rearing business in that plant. The same disease has been diagnosed in a grain-fed herd on a ranch adjoining the Fontana garbage-plant.

In sifting information gathered from garbage-feeders, points which seemed worthy of consideration were that the disease occurred in a somewhat prolonged storm lasting from a year to 18 months, then disappeared somewhat spontaneously in a manner similar to its appearance. One breeder informed us that the litter farrowed secondly to an affected one seemed to be immune.

This made us think of infectious abortion but we were informed that no abortions had occurred and all of the pigs seemed normal at birth. This, however, did not entirely exclude the fact that the abortion organism was present and the cause of the disease, directly or indirectly. Conflicting remarks made us doubt somewhat the accuracy of some of the information received from various sources.

It is hard to say how much of the disease may be prevalent in the United States. Farmers who feed grain, and garbage-feeders also, usually throw pigs dead at this age out of the farrowing-pen and haul them away with manure or other refuse without postmortem examination. Losses are so common among pigs at farrowing time, and from two to five days following, that they are accepted by many swine-breeders as unavoidable. Among the comparatively few cases examined by diagnostic laboratories, postmortem changes may have interfered with the examination to such an extent that intestinal changes were not recognized.

The description of idiopathic anemia in newborn pigs by Graham and Thorp¹ has some points in common with our young pig disease but they emphasize symptoms and lesions of anemia and omit the enteritis. This leads us to conclude that they were dealing with a different condition.

In consultation with Dr. L. F. Conti, of the Los Angeles County Live Stock Inspection Department, he informed us that he recognized the same young pig disease ten years ago on the same ranch and that it was controlled by restricting the diet of the sows when they were put into farrowing-pens in which exercise was limited. We have tried the restricted diet treatment but in our hands it has given negative results.

Others who have been consulted are Drs. George H. Hart and Fred M. Hayes, of the Division of Veterinary Science of the University of California, at Davis. Mr. H. R. Gilbert, of the same division, kindly ran a few tests on livers from diseased pigs for vitamin A and found no deficiency. Dr. L. M. Hurt, of the Los Angeles County Live Stock Inspection Department, and Dr. K. F. Meyer, of the George William Hooper Foundation, San Francisco, have visited the ranch, observed specimens and given much appreciated suggestions.

The enteritis and diarrhea observed reminded us of the work done on the bacteriology of the intestinal tract of young calves with special reference to the early diarrhea, commonly called "scours," by Dr. Theobald Smith and co-workers of the Rocke-

feller Institute for Medical Research, at Princeton, N. J. These references were not available at Fontana and were very kindly furnished us by Dr. Meyer shortly after his visit to the ranch.

Smith and Little²⁻⁴ have shown that newborn calves fed on milk in place of colostrum, with few exceptions, succumbed within a few days to a generalized infection with *B. coli*. Colostrum was found to furnish the majority of cases with protection against calf scours.

Dr. C. N. McBryde, of the U. S. Bureau of Animal Industry, working in the laboratory of the Fontana Farms Company, investigating bacteriologically the enteritis of newborn pigs, has found evidence which would incriminate *B. coli* as a causative factor. We are merely mentioning this here, for Dr. McBryde will, no doubt, publish the results of his investigation.*

Observations of frequent abortions, especially in first pregnancies, led to investigation while Dr. McBryde was with us. Enough reactors by the agglutination test have been found to show us that we have an infectious abortion problem to solve. This was not an agreeable discovery because of the introduction of many breeding irregularities, sterility, septic metritis and the like, and the transmissibility to man in the form of undulant fever. Rubber gloves are worn for all autopsies and the handling of blood, and every reasonable precaution is taken to prevent infection.

At present we feel that infectious abortion is one factor causing a considerable number of small, weak pigs, and that either *B. coli* on the skin of the sow's teats or in the colostrum, or perhaps the Bang organism in the colostrum, may be causing the fatal enteritis. Hayes and Phipps,⁵ under the heading of "Other organisms as a possible cause of swine abortion," describe an outbreak of the disease in which *Bacillus coli communior* seemed to be the causative agent. We cannot say at this time what organisms other than *Brucella abortus* (Bang) are active in the herd at Fontana.

We have carried out a large number of experiments along lines of sanitation and nutrition in an attempt at control and to date only one thing has seemed to have a favorable influence on losses. When the pigs are taken away from the sow as soon as farrowed and kept in boxes from four to six hours, then returned and permitted to nurse, fewer cases develop. The beneficial influence

*These findings were reported by Dr. McBryde at the 1933 convention of the A. V. M. A. See: McBryde, C. N.: Acute enteritis in young pigs due to infection with colon group. Jour. A. V. M. A. lxxxiv (1934), n. s. 37 (1), pp. 36-49.

in this procedure is more likely due to changes occurring in the pigs than in the sow.

Smith and Orcutt⁶ found that in newborn calves not suckling, bacteria penetrate as far as the cecum within twelve hours. These investigators state that to this point the meconium is liquid and favorable to a rapid diffusion of bacteria, while below the cecum the meconium is much drier. If analogous changes occur in the intestine of newborn pigs, the four to six hours spent in boxes before nursing may give time for the creation of more resistance to the invasion of *B. coli*. Attempts to reproduce the disease by feeding and by intra-axillary injection of the contents of the diseased area of the small intestine have failed. Satisfactory control measures have not as yet been found.

ANEMIA

Taking up briefly the second disease enumerated in our list of six, we can say that the anemia hazard, which is greatest at about 21 to 35 days of age, is quite satisfactorily controlled by furnishing dirt floors in part of the farrowing-pens or by shoveling it into the cement runs until the pigs are removed to dirt lots. This prevention was begun a year ago on the advice of Dr. McBryde.

HOG CHOLERA

Hog cholera has furnished its share of losses. The daily routine of autopsies in November soon revealed lesions typical of cholera in pigs and shotes which had been vaccinated longer than a month. Injections of heart-blood into susceptible pigs reproduced the disease.

Injection of virus alone, in shotes that had been vaccinated four to six months previously, showed about one to three per cent susceptibility. A faulty virus immunity is a relative one that is present in degree and is not of the absolute type which is demonstrated in the immune hog by the hyperimmunizing process in serum production. With this relative faulty type of virus immunity we observe a gradual slanting off or fading, and an increasing number of animals becoming susceptible. A virus break entails heavy losses because of the advanced age at which it is apt to occur. With a faulty hog cholera immunity in a herd, one cannot estimate losses from other primary or secondary causes because of the group of secondary diseases which follow in the wake of hog cholera virus action.

Before we had finished with the virus break, over 9,000 hogs had been revaccinated and we were revaccinating behind the daily

diagnosis of hog cholera practically all of the time. Certainly one can do little toward the control of swine disease in a garbage-plant when the hog cholera immunity is questionable. Cholera must be controlled and our efforts have been directed toward that end. A laboratory has been planned and built and since February 14 we have produced all of our own virus.

We have felt for a number of years that a virus-alone test should be made of every vaccinated hog before he reaches an advanced age and has cost his owner feed and care over the period of months required to grow him to market weight. Theoretically, vaccinated hogs under constant pen exposure to hog cholera will acquire more active immunity against the disease. But pen exposure cannot be depended upon to furnish the virus necessary to give a hog the solid, lasting immunity which is conferred by the actual injection of potent virus.

In an attempt to prevent a recurrence of a virus break, we are checking our simultaneous method of vaccination with a virus-alone injection. We are compelled to vaccinate at from four to five weeks of age. In attempting to wait until pigs were six weeks of age, we have had losses from cholera. Pigs are weaned when twelve weeks old. A week or ten days after being weaned, each pig is given 2.5 cc of virus alone. This has been made a routine procedure since early in February and our losses from hog cholera following the virus-alone injection have been practically nil. It will take at least a year, however, to determine whether this method has put our hog cholera immunity on an absolutely solid basis.

The cost of the virus-alone test, per head, is small. Two and one-half cents pays for the virus and as many as 1,814 head have been injected in a day by one man using a Shikles No. 1 outfit, with seven laborers handling the animals that averaged over 50 pounds in weight.

We are experimenting with serum production by using the intraperitoneal injection of virus instead of the intravenous injection, and throat-bleeding in from twelve to 21 days instead of tail-bleeding. We are using light immunes of 150 to 200 pounds, which means a shorter time immune than if we used heavier ones. The market demand is for hogs of this weight and in order to dispose of the carcasses to the best advantage we hope to be able to use them.

In these experiments the immune is suspended by the hind legs after being weighed. He should be weighed on track scales after being hung up and if this becomes a routine procedure

the track scales will be the equipment used. The region of the groin is painted with tincture of iodine and the necessary dose of virus injected with a Shikles outfit.

In testing the serum we divide the weight of the test pigs by two, three, four or five, to learn the number of pounds live weight which 1 cc of serum will protect. In this manner we can figure the potency of a serum in a way approaching mathematical precision. For example, if we find 1 cc of serum protecting three pounds live weight, for convenience we call it a three-point serum; if four pounds, a four-point serum, etc. We use 3 cc of virus as a constant dose in these serum tests. In hyperimmunizing intraperitoneally we started with a dose of 2.5 cc per pound live weight and have given as much as 6 cc per pound. The animals have tolerated these dosages well and in twelve days to three weeks, when they were slaughtered, have shown nothing abnormal in the peritoneal cavity. Perfect absorption of the virus seems to have taken place.

We are comparing the serum produced by the experimental intraperitoneal method with serum produced by the orthodox intravenous method. Our data are incomplete but present indications are that within certain limits there is a close relation between the hyperimmunizing dose and the potency of the serum produced. An injection of 3 cc of virus per pound live weight, other factors being equal, produces about a three-point serum, that is, a serum 1 cc of which will protect three pounds live weight in the test pig.

Our test animals have been older and larger than we prefer to use. Most of them have weighed from 80 to 150 pounds. Allowance must be made for this when the serum is used on lighter, younger pigs, for the younger the susceptible pig, the more serum per pound he requires to protect him from the virus.

PNEUMONIA AND PLEURISY

Under the fourth heading, pneumonia and pleurisy have been named together, for they occur together so frequently that we believe the lack of one or the other depends principally on intensity of involvement. In paracute cases of pneumonia pleurisy is the rule but may be absent, and in less acute cases it may be present. In still milder cases which tend to become chronic, a chronic pleuritis is very frequently found in which productive inflammation has resulted in adhesions of varying extent. On the extent of these old adhesions between the visceral and parietal pleurae depends largely how well the hog will thrive. If the adhesions are extensive, the animal becomes emaciated and weak-

ened constitutionally. He finally picks the wrong mouthful of garbage, develops an acute gastro-enteritis and dies, or may be given the axe because of his hopeless condition. Many hogs with less extensive adhesions thrive fairly well, reach a somewhat delayed market weight and are slaughtered.

A number of factors are involved in causing these respiratory diseases. *Bacillus suisepiticus* has been incriminated most frequently as the direct cause of pneumonia in swine but Dr. McBryde,⁷ in his investigations a year ago, found evidence in the herd at Fontana that *Bacillus suispestifer* also is responsible. Predisposing causes are of the greatest importance in planning and executing control measures.

Dust mixed with dry manure which has been ground finely under foot, especially when accumulated in dust-holes, is like poison to pigs from six weeks to six months of age, and even after six months of age we get plenty of pneumonia and pleurisy cases. Frequent cleaning of the manure from the surface of the lot and wetting down of the dust-holes are absolutely necessary in the control of these respiratory troubles. The intensive sunlight is a natural germicidal agent of great importance, but when germs are protected in manure they remain a menace to the health and life of swine.

Other predisposing factors are the extremes of temperatures which without doubt play an important part. The minimum and maximum temperatures recorded during the hot wave, June 11 to 16, inclusive, increased our losses from pneumonia and pleurisy very strikingly.

Date	Minimum	Maximum
June 11 to 12	52	95
June 12 to 13	50	103
June 13 to 14	50	107
June 14 to 15	54	105
June 15 to 16	55	89

On June 13, the lowest temperature occurred shortly before sunrise, at 4:30 a.m., and was 50° F. At 6:00 a.m., it was 60; at 8:00 a.m., 82; at 10:00 a.m., 95; a variation of 45 degrees in five and one-half hours. In the evening of the same day, the drop from 5:00 p.m. to 10:00 p.m. was 30 degrees.

In the home, parents make the rounds between 10:00 p.m. and midnight in order to put more covers over their children. Pigs need a similar protection, as the night air becomes cooler. They need properly ventilated sheds and they should be forced to stay in them, otherwise they pile up in dust-holes in the evening and as the night air becomes colder, those around the outside move

toward the center over others. The pigs at the bottom of the pile breathe manure-laden dust, become hot and steamy and in the morning, upon leaving the pile, become chilled and respiratory diseases are the result. Much coughing, indicating bronchitis, is observed and under the conditions just described it is a short step from a bronchitis to a pneumonia with pleuritis and pericarditis also developing.

GASTRO-ENTERITIS

Gastro-enteritis, the fifth disease on the list, very often accompanies pneumonia and pleurisy and requires practically the same preventive measures. Additional cases, fewer in number, are caused by obnoxious materials in the garbage. A certain percentage of the latter is unpreventable.

ABORTION

With the last of the six diseases mentioned, infectious abortion, we think at once about the two fundamental methods of disease control, *i.e.*, isolation and vaccination. In permanent lots where 10,000 brood sows and 150 boars are breeding twelve months in the year, isolation does not appeal as a practical control measure.

Isolation, to me, is a word like *perfection*. It cannot be compared. There are no positive, comparative and superlative degrees; no good, better, best isolation. One either isolates diseased animals or he does not. If a susceptible animal comes in direct contact with a particle of food or bedding, piece of equipment such as a feed-box or watering-trough, or any other materials or space which a sick animal has contaminated, the word "isolation" does not apply.

In the swine herd under discussion, we feel quite certain that abortion, sterility difficulties, and weak pigs are more or less a result of the activities of *Brucella abortus* (Bang). The relations which we suspect it has with the enteritis in the newborn have already been explained.

We know that if we can practice isolation in the true sense of the word, we can control this disease, but we hope we may be able to approach this most difficult task from other angles, however small the chances of success may be. We consider vaccination against abortion the most important animal disease research problem of the day.

I wish to conclude by repeating parts of my introduction, that is, that the permanent hog-lot has long been known to be an unhealthy environment. It is hardly possible to criticize its use

too severely. To this I would add that preventive treatment against swine diseases in such an environment must be practiced along broad lines. Breeding, feeding and housing problems are involved as well as sanitation, isolation and vaccination. Porcine nature and human nature must be reckoned with in the attempt to apply knowledge and gain newer knowledge of swine diseases and their control.

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New York Broadcasting Program

The New York State Veterinary Medical Society sponsored the following talks given over WGY (General Electric Station), from February 9 to March 23:

February 9—"Feeding Newborn Animals," Dr. Myron G. Fincher, New York State Veterinary College, Ithaca.

February 23—"Grubbing Out Cattle Grubs (Cattle Grubs—Cause and Prevention)," Dr. H. C. Parker, Hillsdale.

March 9—"Discovering New Stars for the 'Milky Way' (Selecting a Dairy Cow)," Dr. L. E. Moore, Amsterdam.

March 23—"Problems in the Dairy Kindergarten (Some Calf Problems)," Dr. James H. Hewitt, Borden's Farm Products Co., Washingtonville.

Programs scheduled for April and May are as follows:

April 6—"The Horse's Ankles (Diseases of Fetlock and Ankle of the Horse)," Dr. J. N. Frost, New York State Veterinary College, Ithaca.

April 20—"Drinking Holes on the Farm (Where Do Farm Animals Drink? or Watering Farm Animals)," Dr. L. L. Parker, Catskill.

May 4—"Worms a Sheep Can't Stomach (Stomach Worms in Sheep)," Dr. Donald W. Baker, New York State Veterinary College, Ithaca.

May 18—"Why Pigs Are Poorly (Some Swine Diseases)," Dr. B. J. Cady, U. S. Bureau of Animal Industry, Albany.

These biweekly programs are broadcast on Friday, at 12:30 p.m., Eastern Standard Time.

BRUCELLA INFECTION OF SWINE*

By S. H. McNUTT, Ames, Iowa

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This report has to do with some phases of *Brucella* infection in hogs, particularly death of mature animals. Some individuals, working with *Brucella* infection in the human, in the past, often have compared the disease there with the condition found in dumb animals, showing that while, in man, the disease is of serious nature, in animals evidence of infection is lacking except for abortion. To those working with *Brucella* infection in animals, it is clear that nearly all, if not all, the manifestations of the disease found in man may be present in animals and that even death of mature animals may result either directly or indirectly from such infection, although these symptoms and results may be less common than in man. That fetuses are destroyed by the disease in animals is self-evident.

Smith,¹ Hallman² and others have shown that pneumonia may be associated with *Brucella abortus* in new-born calves. Boyd, Delez and Fitch,³ Kraneveld⁴ and others have shown that the infection is evidently a cause of inflammatory disease of the joints of cattle. Many authors have shown that the organism may localize in the lymph-nodes, testicles, bones and udder. In many of these organs, considerable pathological change takes place that must influence adversely the general health of the affected individuals. Hallman, Sholl and Delez⁵ report that *Brucella* infection in udders of cows is associated with a subacute or chronic interstitial mastitis. James⁶ and James and Graham⁷ isolated *Brucella melitensis* var. *suis* from cases of porcine osteomyelitis, pyemic arthritis and pyemic bursitis. Rinjard and Hilger,⁸ Fitch, Delez and Boyd,⁹ and Fitch, Bishop and Boyd¹⁰ report isolation of *Brucella* from fistulae of the p^{el}l and withers in horses. The above is a meager outline of some of the information showing that the disease may be of importance in ways other than abortion with its associated after-effects.

In guinea pigs injected with *Brucella*, the resulting lesions resemble tuberculosis, at least to a slight degree. (See fig. 1.) This similarity is seen also in microscopic sections. Hence, it is interesting that, in the limited number of infected swine lymph-nodes which we have examined microscopically, the lesions resemble those caused by a pyogenic infection and are not at all like tubercles. Pus formation in the gross is common in the

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guinea pig, but we have not observed such macroscopic lesions in swine lymph-nodes. Badly affected nodes appeared large, soft, and often contained much fluid or almost gelatinous material which was highly cellular when squeezed from the tissue.

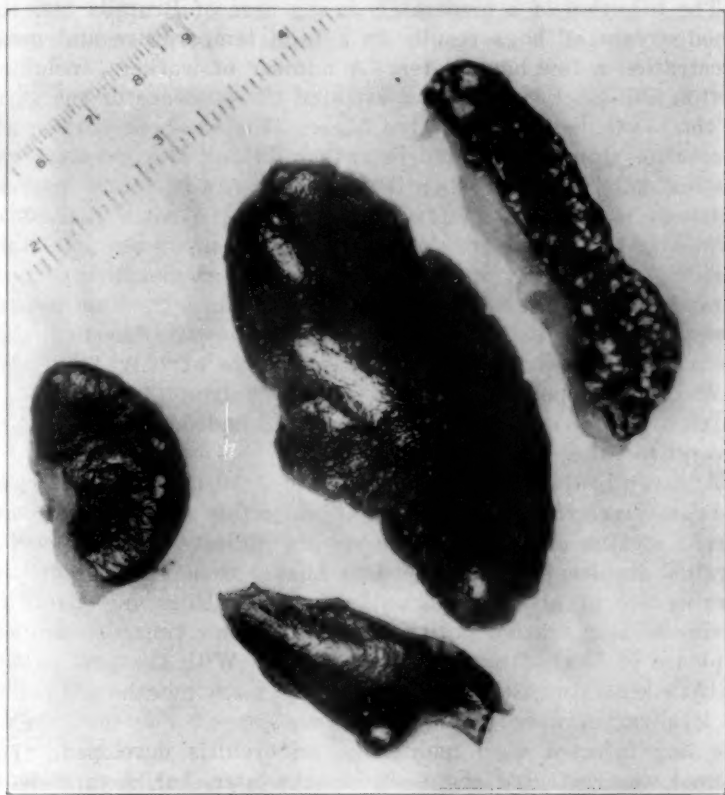


FIG. 1. Showing small, tubercle-like abscesses in the spleen, liver, lungs, and kidney of a rabbit.

In sections there was much increase in interstitial tissue. This was rather a surprise since the nodes were found to be soft when examined macroscopically. However, the new formed tissue was loose, perhaps edematous, which accounted for the consistency of the nodes. Such interstitial increase appeared mostly along the trabeculae but also extended deeply into the nodes as if to wall off some necrotic or purulent area. It contained many wandering cells. The lymph-follicles were enlarged with very large germ centers. Between the follicles were numerous areas heavily infiltrated with polymorphonuclear cells, many of which

showed karyorrhexis. It would appear then that there is here the beginning of abscess formation, an infiltration with polymorphonuclear cells, a degeneration and necrosis of such cells and a beginning encapsulation of the area.

The injection of a moderately heavy dose of *Brucella* into the blood-stream of hogs results in a high temperature and great prostration a few hours later. A number of workers, including Cotton and Buck,¹³ have demonstrated the presence of the germ in the blood-stream of infected hogs. This has been our experience also. Indeed, it would be rather difficult to conceive of no blood-stream infection when the organism can be found in great numbers in so many different organs in the same individual. Evidently the organism is present in the blood-stream at certain periods, and possibly at such times there is an elevation of temperature that could be detected if the hog had a constant normal temperature. Cotton and Buck¹³ obtained positive blood cultures from a hog showing an agglutination titre of only 1:50. We have obtained positive cultures from the lymph-nodes of such animals. In one of our cases, the animal had been a reactor for several months.

Apparently an agglutination titre of 1:50 and possibly lower indicates infection in hogs.* In the injection of hogs with different strains of *Brucella*, our results indicate that the bovine strains are least pathogenic and that porcine and melitensis strains are of about equal pathogenicity. Hogs injected with bovine strains reacted positively for a shorter time, and clinical evidence of localization was not present. With the porcine and melitensis strains, the titre persisted for many months and points of localization were observed in some cases. For instance, in one hog injected with melitensis, an orchitis developed. The animal was castrated about six months later, but, regardless of the removal of this area of localization, an agglutination titre of 1:50 or above persisted for 18 months longer. These animals were injected at from 20 to 70 pounds. This would seem to be in line with the results obtained by Cotton and Buck,¹³ who found that the porcine strains were apparently less pathogenic for the cow than were bovine strains.

Cotton¹² reported that Schroeder and he had observed one cow that harbored *Br. abortus* in the uterus for 51 days after abortion. Fitch, Delez and Boyd¹¹ state that in cows the uterus is usually free of *Br. abortus* three to four weeks after abortion. Our findings in the sow are in contrast to this. A group of aged sows were tested about eight months after they had had their last litters. Of this group, we found six reacting pregnant sows,

and ten reacting non-pregnant animals. It was not known how long the animals had been infected. The sows were slaughtered. Of the non-pregnant, three of the ten showed *Brucella* in the uterus, and in two of these cases, there was an extensive endometritis, with enormous numbers of *Brucella* present so that smears showed great masses of the organism. (See fig. 2.) Of

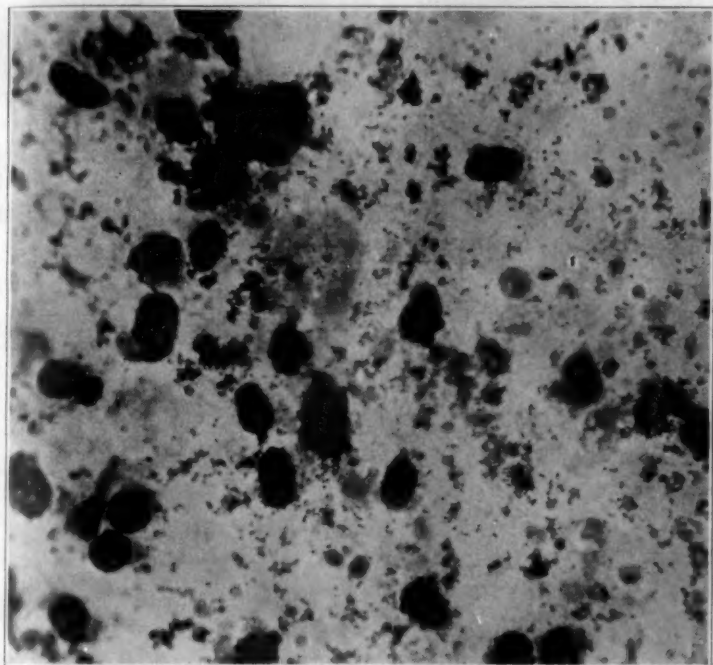


FIG. 2. Showing masses of *Br. melitensis* var. *suis* in a smear made direct from the uterus of a sow. The solid, dark objects are epithelial cells and leucocytes. The organisms appear as granular masses, in small clumps, or even singly.

the reacting pregnant sows, two out of the six showed *Br. abortus* in their uteri. This indicates that infection in the uterus is independent of pregnancy, the organism localizing either in the pregnant or non-pregnant uterus; in fact, the non-pregnant uteri were found infected nearly as often as the pregnant.

The above would indicate that the tissues of the hog are apt not to possess much natural immunity to the porcine variety of *Brucella*, that the organism may wander almost at will through the body and that very real disease changes may result. Hence, it is not surprising that an occasional infected hog should die

and that death should be attributed to such infection. In one of our herds of hogs, three boars have died or were killed when near death. The first animal, farrowed March 10, 1930, was tested first in February, 1931, when he reacted 1:3200. (See fig 3.) A few days later, he became stiff, sore, and remained in a recumbent position. These symptoms became gradually worse, until May, 1932, when the animal was no longer able to stand on its hind legs and was weak and emaciated. The animal was killed and autopsied. The internal organs appeared normal except for the liver and spleen. The liver was enlarged and showed several scars from previous parasitism. The spleen was enlarged and congested. Complete ankylosis of the metatarsal and tarsal bones of the left hind leg was present. Several joints of both the fore and hind legs showed severe inflammation with much fluid. A mild orchitis was observed. Cultures from the spleen, joints, testicles and liver showed large numbers of *Brucella* in pure culture. Other organs were not cultured.



FIG. 3. The first infected boar at ten days after symptoms developed and about three months before death.

A second boar, farrowed March 5, 1929, went off feed in October, 1932, showed swelling of the testicles a few days later, and had a high agglutination titre. The animal became rapidly worse, until December 23, 1932, when it was evident that there was no chance of recovery and he was killed. For ten days, he had been unable to get up without help. He had weighed about 600 pounds, but lost about 200 pounds while sick. (See figs. 4 and 5.) Autopsy examination showed no disease except infection with *Brucella*. Cultures showed *Brucella* pure and in large numbers. The testicles were of special interest. They were of equal size, weighing together 28 pounds, with maximum dimensions of $12\frac{1}{2} \times 9\frac{1}{2} \times 6$ inches. (See fig. 6.) Either testicle showed a large hematoma in its lower posterior part that contained about



FIG. 4. Showing enlargement of testicles. The testicles of this animal weighed 14 pounds each.

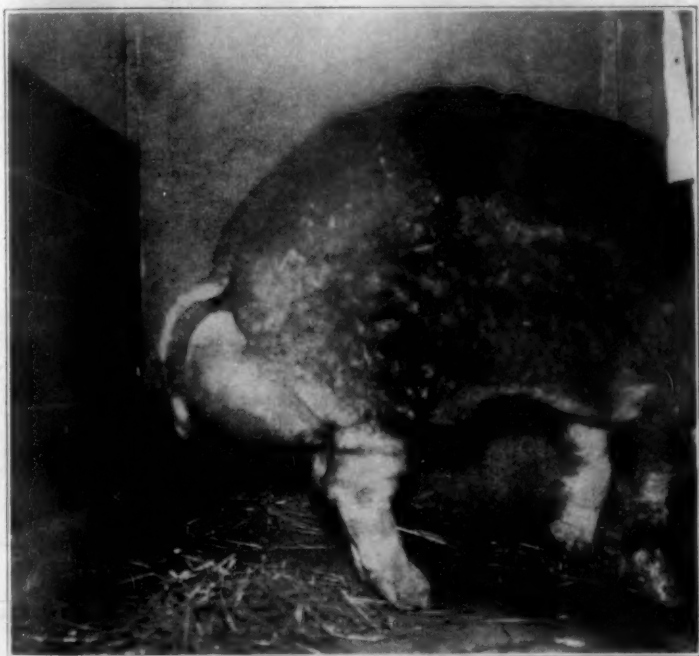


FIG. 5. Another view of boar shown in figure 4.

a quart of dark, clotted blood. Aside from the enormous size and large hemorrhages in these organs, the pathological changes were similar to those described by a number of authors. The parenchyma was completely destroyed.

A third boar in this herd, farrowed in September, 1930, reacted positively in February, 1933, and was to be castrated. However, early in March, 1933, before he was castrated, he went off feed and showed an elevation of temperature and an acute

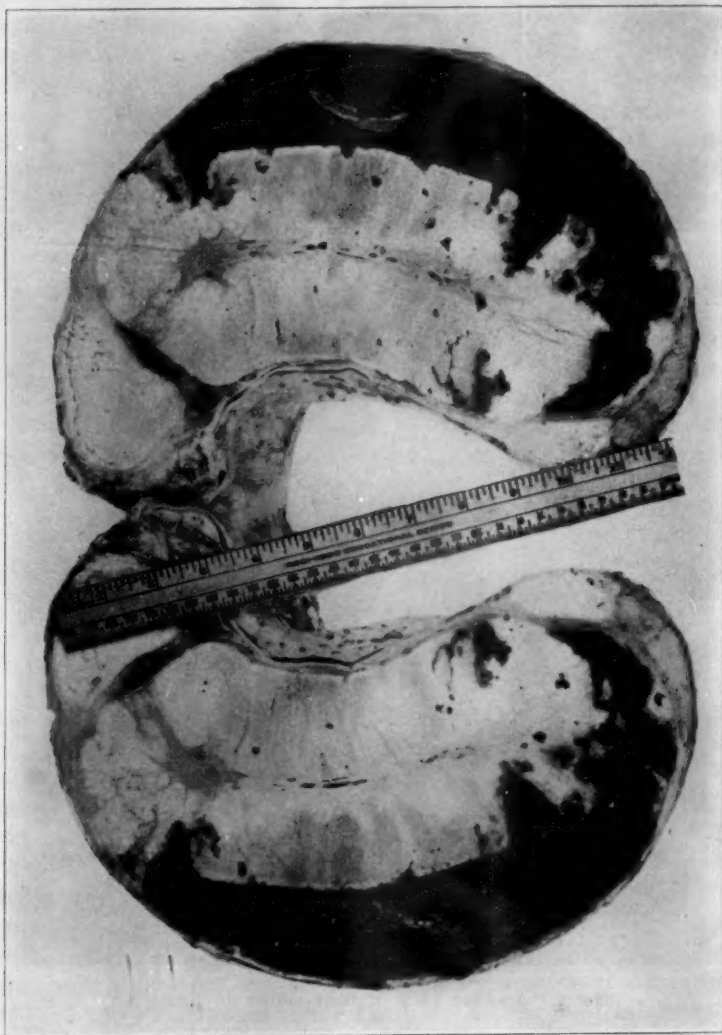


FIG. 6. Testicle from an infected boar. Testicle is cut in half. Ruler indicates size. Dark area is a hemorrhage.

orchitis. The animal was castrated a week later, and died two days thereafter. Thus, he died within ten days after showing symptoms. Through error, he was not autopsied. At this time, no other disease aside from that caused by *Brucella* was present in the herd, and no other animals died. The animal showed symptoms observed in infection with *Brucella*. There seems to be no doubt but that this animal died of *Brucella* infection and castration at the height of the disease. This appears especially true, since two boars from the herd are shown beyond reasonable doubt to have died of the infection or at least would have died if they had not been killed to facilitate examination.

CONCLUSIONS

Evidence is presented to show that *Brucella* infection of swine results in a disease in which occur pathological changes of real significance even though clinical symptoms may not be evident. The disease may be so severe as to cause death. A report is given of three animals that died of natural infection. Animals with an agglutination titre of only 1:50 have been found infected. In cases examined, localization of the organism in the uterus has been independent of pregnancy.

ACKNOWLEDGMENT

I am indebted to Doctor C. D. Lee, of the Pathology Department, for autopsy and culture records on the first boar reported.

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ISOLATION OF BACTERIA OF THE BRUCELLA GROUP IN CASES OF SPONDYLITIS OF SWINE: AN ADDITIONAL STUDY*

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We have recently¹ described a specific necrobiotic focal destruction of the vertebrae of swine which was associated in a number of instances with bacteria of the Brucella group. In the previous study, lesions were obtained from 24 different animals and an organism with the cultural, pathogenic and antigenic characteristics of the Brucella group was obtained from ten. Since the report mentioned was submitted for publication, we have obtained for museum purposes an additional series of approximately 30 specimens from as many different animals. Portions of the morbid tissues of 20 of these were utilized, in an attempt to demonstrate an infective agent of possible etiologic significance.

MATERIAL

The entire series was obtained from an abattoir in southeastern Minnesota, operating under the supervision of the U. S. Bureau of Animal Industry. Dr. D. D. Tierney, veterinary inspector, assisted in securing the material.

The exact geographic origin of the respective swine from which the lesions were obtained is not known, although the majority of the swine originated in an area embracing southwestern Minnesota and northwestern Iowa. The breed of swine from which the respective specimens were obtained is not known. The location of the lesions in the 20 cases that formed the basis of this study is of interest. In nine, the bodies of the last lumbar and first sacral vertebrae, or the lumbosacral articulation, were affected. The lesions were situated in the lumbar vertebrae in eight instances, whereas the thoracic vertebrae were affected twice, and in one case the lesion involved the second and third sacral vertebrae.

Fifteen of the swine were females, three were males, and the sex of two was not determined. The age of sixteen of the swine was estimated as follows: six were from five to six months of age; six were from eight to ten months, and four were aged one year or more.

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METHODS

Since our laboratory is situated a little distance from the abattoir, it was customary to hold carcasses affected with spondylitis in the refrigerator at the abattoir until several had accumulated. It usually required a week or more to obtain eight to ten carcasses that revealed the lesion, and when this number was available a visit was made to the slaughtering establishment and the respective lesions were secured. With a heavy cleaver, a liberal portion of the split vertebral column containing the diseased tissue was removed and placed immediately in modified Kaiserling solution for museum purposes; when possible, the other half of the split vertebrae containing the specific lesion was placed in dry borax, to be utilized later when studying the etiology of the morbid process.

As previously mentioned, twenty specimens were secured with lesions of such a character as to be acceptable for culture and inoculation of animals. The diseased vertebrae were placed for a few seconds in boiling water to remove the encrusted borax, and to eliminate possible extraneous contamination. Portions of the necrotic content of the respective bony cavitations were spread over the surface of culture medium, and the remainder was emulsified with physiologic solution of sodium chlorid for inoculation of animals.

CULTURE

Four tubes of liver-infusion agar were inoculated with the necrotic substance from each of 20 specimens. These were incubated under atmospheric conditions at 37.5°C. for three to five days, and subcultures were made from those that revealed characteristic bacterial colonies. In only two of the cases were organisms obtained which possessed the morphologic characteristics of bacteria of the *Brucella* group, and which were agglutinable in the presence of blood-serum of a rabbit known to harbor specific agglutinins as a consequence of an infection with an organism of the *Brucella* group.

INOCULATION OF ANIMALS

The emulsions prepared from each of the respective lesions were used to inoculate two guinea pigs. When possible, only male animals were used, and all inoculations were made subcutaneously over the upper part of the abdomen. The animals which were living after approximately eight weeks were killed for necropsy, and material was obtained for further study. If the animals died within three weeks of inoculation, the experiments were

considered to be failures, but from all other guinea pigs that died before the expiration of eight weeks, cultures were made from the spleen, and tissues were preserved for histologic study.

The results of inoculation of animals were somewhat better than those obtained from the inoculation of media with material direct from the original lesions. However, material from only three of the original lesions of bone induced evidence in guinea pigs of a specific infection with organisms of the *Brucella* group. The criteria of infection consisted of the presence of specific agglutinins in the blood at the time of death, characteristic morbid changes of tissues such as the spleen, liver and epididymis, and a positive culture of organisms belonging to the *Brucella* group from an emulsified portion of the spleen.



FIG. 1. Spondylitis of a male hog aged nine months. The process involves the adjacent epiphyses of the bodies of the last lumbar and first sacral vertebrae. The ventral surfaces of the diseased vertebrae are underlain by an exuberance of new bone tissue, 1.5 cm thick.

The results of the cultures and of inoculation of animals with material derived from specimens in which the presence of bacteria of the *Brucella* group had been demonstrated are summarized in table I.

ADDITIONAL OBSERVATIONS OF THE MORBID ANATOMY OF THE LESION OF SPONDYLITIS

The morbid anatomy of the lesions of spondylitis, as they occur in the bodies of the involved vertebrae, was described in our previous paper.¹ The approximately 30 specimens on which this paper is based have furnished an additional opportunity to study

TABLE I—Successful attempts to demonstrate bacteria of the *Brucella* group derived from lesions of spondylitis of swine.

SWINE	AGE (MONTHS)	INVOLVED REGION	DIRECT CULTURE	GUINEA PIG INOCULATION*					
				GUINEA PIG A			GUINEA PIG B		
				MAXIMAL AGGLUTINATION TITRE	SPLENIC CULTURE	GROSS LESIONS	MAXIMAL AGGLUTI- NATION TITRE	SPLENIC CULTURE	GROSS LESIONS
1	10	Lumbosacral	Negative	Not determined	Not done	Negative	1:50†	Positive	Spleen enlarged; few foci in liver
2	5	Lumbosacral	Positive	Not determined	Not done	Negative	1:800	Positive	Adenitis; foci in lung, liver and spleen
3	5	Lumbosacral	Positive	1:800	Positive	Foci in liver and spleen	1:1,600	Positive	Spleen enlarged

*Data were not obtained on animals that died less than three weeks after inoculation.

†The antigen used to determine the presence of agglutinins was obtained from Dr. C. P. Fitch, of the University of Minnesota.

specimens, both grossly and by the aid of roentgenograms, and in this latter work we have observed an associated condition in the nature of an exostosis which we consider of significance. Dr. J. D. Coate, fellow in roentgenology of The Mayo Clinic, made the roentgenograms. On longitudinal section, this exostosis consisted usually of a crescent-shaped, cap-like inflammatory proliferation of osteogenic tissues, bridging the intervetebral space between the ventral surfaces of the affected vertebrae (figs. 1 and 2). On cross-section the periosteum usually is discernible, with the new bone bulging downward from the vertebral structure. The amount of ossification is variable, depending on the

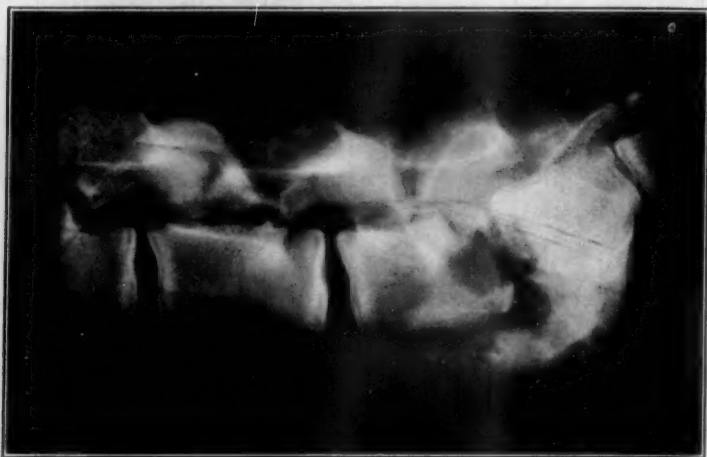


FIG. 2. Roentgenogram of the specimen shown in figure 1. The destruction of bone is evidenced by the irregular cavitations in the adjacent epiphyses of the bodies of the last lumbar and first sacral vertebrae. The underlying exostosis is marked.
Exposure 20 P.K.V. 10 ma. 12 sec. Double screen
distance approximately 40 in.

duration of the lesion; it is less in the earlier stages and complete in the more chronic cases. A tough, fibrous covering invests the structure, which frequently has an uneven, furrowed surface.

From examination of the roentgenograms, it appears that the exostosis has its inception near the epiphyses of the diseased vertebrae. Since many of the focal abscesses involve the intervertebral disks, it is not surprising that the adjacent vertebrae should give expression to a reparative process as part of the inflammatory reaction. The resultant callus provides a certain rigidity and strength to the diseased parts of the spinal column that perhaps safeguards the structure against fracture.

COMMENT

The results obtained in this study are of interest because of the relatively few lesions from which organisms of the *Brucella* group were obtained. In our previous study a specific infection with an organism of the *Brucella* group was demonstrated in ten (42 per cent) of 24 specimens, whereas in the present series the percentage is reduced to 15.

The explanation of this marked difference is not obvious. The lesions in the two series of specimens were comparable, and the means used to ascertain the presence of organisms of the *Brucella* group were similar. Since the methods used were suitable for the detection of pathogenic mycobacteria, if such organisms had been present, it is hardly probable that lesions that failed to yield organisms of the *Brucella* group were tuberculous.

The more likely reason for our failure to obtain specific bacteria from the 17 specimens in which the results were negative may be the viability of the organism. The disease, as manifested in the vertebrae of swine, is characterized by its chronicity, with an investment of the necrotic process by a dense, thick capsule. The character of the inflammatory and reparative response is such as to minimize the blood-supply and, as a consequence, what may at first have been a favorable environment for the multiplication of the etiologic agent, eventually becomes a sealed cavity in which the bacteria do not thrive. The tenacity of organisms of the *Brucella* group, when they are residents of a densely encapsulated focus of infection, is not known, but it seems reasonable to believe that inhibition of growth and eventual death of the organism probably occur as a result of certain conditions inimical to their well-being.

The failure of the infective process to become disseminated to other situations in the body in cases of spondylitis of swine is somewhat unusual, when widespread lesions that frequently develop in guinea pigs inoculated with infective material from such a lesion are considered. This suggests the greater susceptibility of the guinea pig to this particular organism, although the relatively large dosage usually administered is probably not without significance. Furthermore, the portal of entry of the organisms, when injected in massive amounts subcutaneously or intraperitoneally, enhances the opportunity of early distribution to organs such as the spleen and liver, whereas in the spontaneous formation of lesions of bone relatively few bacteria are conveyed, probably by the blood-stream, to a tissue the physical character-

istics of which militate against the rapid progress of the disease. Since the development of such a lesion is followed by or paralleled by the formation of a dense fibrous capsule, opportunities for enlargement and metastasis of an infective focus are greatly reduced.

Since there is reason to believe that the majority of infections of the vertebrae of swine caused by organisms of the *Brucella* group have their inception in the first few months of life, it does not seem surprising that after a densely enveloped lesion of this kind has persisted for six to eight months, the provocative agent is no longer viable.

SUMMARY AND CONCLUSIONS

The results of this study confirm previous observations that bacteria of the *Brucella* group are probably of etiologic significance in the pathogenesis of a specific and characteristic form of spondylitis of swine. Twenty specimens from as many different swine were utilized in attempts to demonstrate the causative bacterium by culture and by inoculation of animals. Although in previous work bacteria of the *Brucella* group were obtained in 45 per cent of the lesions studied, positive results were secured in only three (15 per cent) of the specimens forming the basis of this report.

An additional observation is the presence, in a large percentage of cases, of a cap or bridge-like exostosis on the ventral aspect of the involved vertebrae, which characteristically extends across the intervertebral articulation.

The percentage of instances in which bacteria of the *Brucella* group can be isolated in cases of spondylitis of swine is never high. In the absence of evidence incriminating other pathogenic bacteria in the genesis of these lesions, the unsuccessful results to demonstrate an infection by organisms of the *Brucella* group are best explained by assuming that the etiologic agent is commonly in a state of greatly lessened viability, or even dead.

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Faint Praise

The old lady placed a very small portion of honey on the plate of the new hired man.

"I see you keep a bee, ma'am," he observed politely.

TWO CASES OF ACTINOMYCOTIC MASTITIS*

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The two cases of actinomycotic mastitis here reported are deemed worthy of mention because of the comparative infrequency of this type of infection in the udder and because in some respects fairly complete data were available, with the clinical histories at least more satisfactory than in many of the cases recorded in the literature, which have been gathered from packing-house material. Actinomycotic infection of the udder occurs in cows and perhaps more frequently in sows. It is found also in the human gland, resulting most often as a direct extension from pulmonary and pleural lesions; but primary actinomycosis is also described (Kaufmann¹). In the mammary gland the condition appears not to have been described in any other species, although other body regions have shown typical lesions of this disease, at least in the horse, sheep, dog, cat and elephant (Jordan²).

CASE 1

The first patient was a Jersey cow about eight years old. History given by the owner and substantiated by a casual examination by a veterinarian at the time is to the effect that when this cow freshened a year previously she showed a mastitis in one hind quarter. This quarter did not function during that lactation period. When the cow freshened again the following year (December, 1930), it was found that both hind quarters now shared in the disease process, all parts of both quarters apparently being involved. After between two and three weeks of the customary local treatment carried out by the owner under veterinary supervision, she was placed in our hospital.

Clinical examination showed the usual evidences of acute, or at any rate of an active, mastitis, involving the whole of these two quarters, with the two forequarters apparently normal. The affected quarters were distinctly enlarged and very hard. Heat and tenderness were less markedly in evidence. There was no serious disturbance in the general health.

During the ensuing seven days, four careful examinations of the milk from each quarter were made. The secretion from the affected quarters was slight in amount and had the usual physical properties encountered in acute mastitis, being watery with flakes of yellowish exudate and semi-solid material. Direct smears in-

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variably showed from the two affected quarters large numbers of staphylococci with almost as many streptococci. These organisms were frequently phagocyted in large numbers. Leucocyte counts, chiefly neutrophile polymorphonuclears, varied from 100 million to 200 million per cc. (Klein³ gives the normal as usually not above 500,000.)

A diagnosis of streptococcic mastitis was made from these findings. The general health of the cow remained fairly satisfactory with a slight loss of appetite and of weight. Blood-cell counts made during this period were within normal limits.

At the end of seven days in the hospital, no improvement was noticeable and amputation of the udder was performed. The amputated gland is described below. Five days after this operation, the animal died, affording opportunity for a complete autopsy. The changes found were chiefly those characteristic of toxemia, including an acute parenchymatous hepatitis shown by central necrosis and periportal lymphocytic infiltrations, cloudy swelling and necrosis of renal epithelium, along with pulmonary emphysema. Loss of typical structure in the lymph-nodes (looked upon as a lymphoid hyperplasia) was noticed and may have been connected with the original disease. A portion of the liver protruding through an old rupture of the diaphragm was not looked upon as having any present significance. A twin pregnancy had advanced three or four months. In view of the findings in the udder after removal, a special search was made for lesions of actinomycosis but none could be found in any part of the cadaver.

The amputated udder showed nothing remarkable in the two fore quarters, but the two hind quarters, which were large and of firm consistency, presented uniformly the tissue changes depicted in figure 1. These two quarters were composed almost exclusively of spherical or irregular globules varying from three to ten millimeters in diameter and sharply outlined each by a capsule of connective tissue. The material within these globular structures was slightly yellow and often gave a granular appearance to the naked eye. It was firm and cheese-like but frequently one or two tiny droplets of what proved to be pus could be pressed out from the cut surface. Each globule was considered probably to correspond to a primary histologic lobule of the original gland. The larger ducts were still intact and contained small amounts of secretion.

Microscopic sections of this tissue showed everywhere the typical picture of what is recognized as actinomycosis. The usual

endothelioid granulation tissue predominated, large reticulo-endothelial, or mononuclear, cells mingling with others that were distinctly fibroblasts. This tissue was more or less regularly arranged in circular, capsule-like structures, at the center of which were one or more of the well known "rosettes" with radiating "clubs" at the periphery; in other words, colonies of organisms ensheathed in a hyaline, eosinophilic substance which serves to form the clubs. The colonies, however, were not usually in direct contiguity with the endothelioid tissue, but were separated from it by an encircling zone of neutrophile polymor-

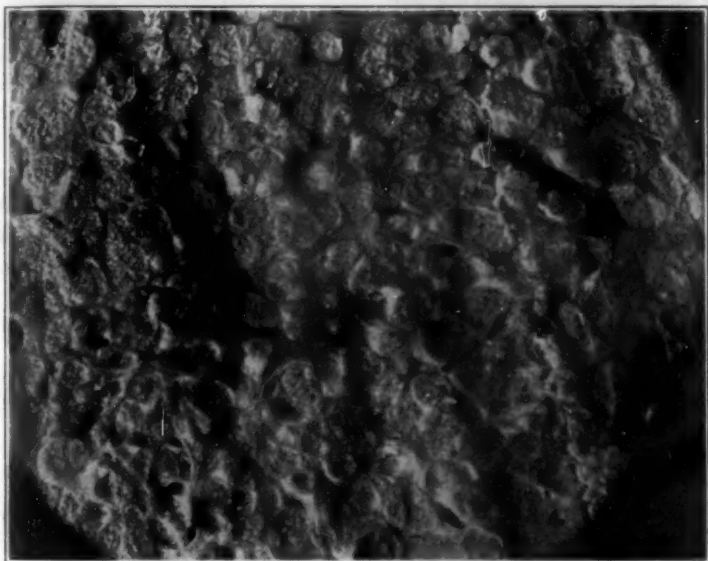


FIG. 1. Cut surface of mammary gland showing actinomycosis.

phonuclears. This was the source of the pus which could be squeezed out at the gross examination. Old colonies and adjacent areas were not infrequently obliterated by calcium deposits. The fat-filled phagocytes common in human actinomycotic granulation tissue were not in evidence. Phagocytosis, on the other hand, of cocci to be mentioned later, was occasionally effected by the mononuclear cells. No giant-cells of any type were seen. Blood-vessels were absent or inconspicuous. There was no necrosis.

The capsule-like layers which formed the walls of the globules seen microscopically proved to be heavy and dense bands of fibrous connective tissue. Irregular strands extended inward

from these until they were lost as scattering fibroblasts amongst the distinctly mononuclear, or endothelial, cells. These connective tissue capsules always surrounded the areas of actinomycotic

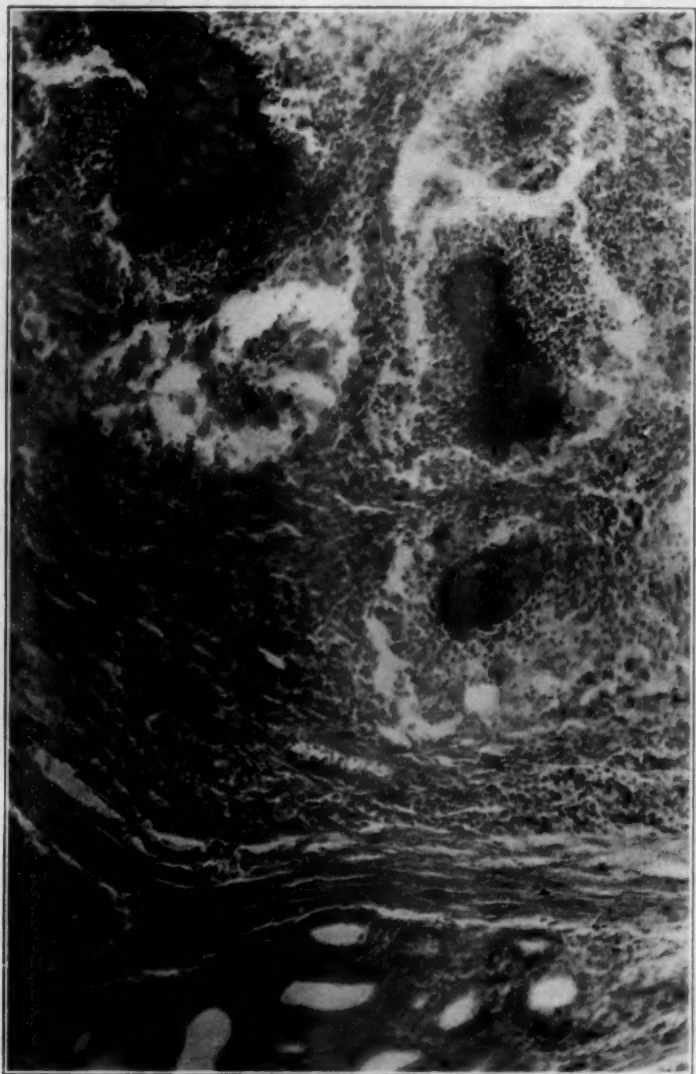


FIG. 2. Section of mammary gland showing colonies of *Actinomyces bovis*.

tissue, separating them completely, it appeared, from the little that remained of the normal histologic structures. Small areas

of compressed and distorted mammary alveoli persisted here and there and were doubtless representative of lobules which had remained free from the invaders. Spread of the infection must have taken place, then, by histologic lobules as units. A lobule was either completely destroyed or entirely free from colonies. It seems likely that this rather complete encapsulation had a decided influence on the escape of organisms into the milk.

The colonies, or rosettes, were given considerable study, especially to determine whether the organism present was actually the filamentous *Actinomyces bovis*, the Gram-negative, rod-shaped *Actinobacillus ligniersi*, or the staphylococcus found by Magnusson⁴ and others in their cases of actinomycosis of the udder. The appearance of the colonies in the usual preparations stained with hematoxylin and eosin is shown in figure 2. The small colonies consisted of a central portion of indistinct, basophilic, granular material surrounded by a pink hyaline periphery in which the radiating clubs were more or less distinctly discernible. The larger colonies were the same except that the blue-staining, or basophilic, material had usually receded towards the periphery, leaving a center of acidophilic amorphous substance.

Numerous sections were stained by Mallory's⁵ modification of the Gram stain. (See figure 3.) This showed the basophilic material to consist of masses of cocci or cells resembling cocci, varying somewhat in size, but nevertheless within the limits of diameter which one expects in ordinary pyogenic species. There were no rods nor filaments. The correctness and suitability of the technic was ascertained by staining tissue from cases of ordinary "lumpy jaw" as controls. In these, rods and filaments were conspicuously evident. The exact nature of the acidophilic, hyaline material, whether it be in the amorphous central masses of the larger colonies or in the club-encircled peripheral sheath, must be left for the present, as others have left it, undetermined. Individual cocci or small clumps of them were not infrequently found outside the discreet colonies scattered among the surrounding body cells. These were without any sheath or hyaline material. Some of them were phagocyted as previously mentioned.

CASE 2

The second case was encountered approximately a year later. It was from the same farm, upon which a herd of about twenty cattle is maintained; and the patient was in fact a daughter of the Jersey cow just described as case 1. A presumptive clinical

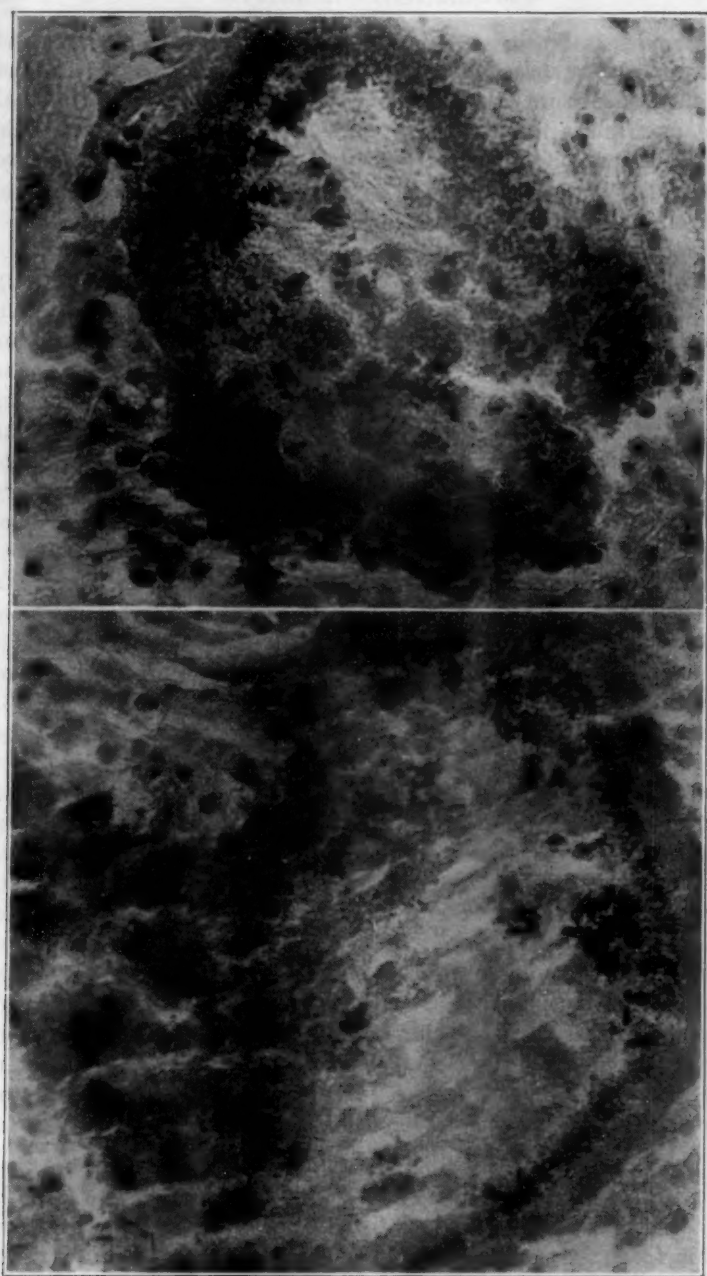


FIG. 3. Two colonies of *Actinomyces bovis* (Mallory's Gram stain).

(640)

diagnosis of actinomycotic mastitis was made and the animal was sent to the butcher. The carcass passed inspection, showing no internal metastases. The udder was returned for pathological examination.

Previous to slaughter, however, a definite search was made in this case for the ray fungus in the milk. The method used was the examination of wet unstained preparations from the secretion of the affected quarters, with or without centrifuging, in the same way that many are accustomed to examine pus for this organism. No granules, rosettes, or colonies, or other evidence of actinomycosis were detected. A method then was developed in which the milk was centrifuged and the copious sediment tied in a little gauze sack. This was then fixed, dehydrated, imbedded in paraffin and sectioned just as if it were a block of tissue. This plan has been found to work well in the examination of various other milk sediments, and it is believed that rosettes, or colonies, could not have escaped detection had they been present. Since considerable delay was occasioned in working out this method, it could be utilized for the case in question only upon material which had been refrigerated for several weeks. Therefore, the possibility of disintegration of the rosettes during that period cannot be overlooked. Suffice it to say that no evidence of actinomycosis was found. Stained smears showed chiefly staphylococci. The physical properties of the secretion were similar to those found in case 1.

Macroscopic and microscopic examinations of this udder were conducted along the same lines as in the first case and yielded identical results. The tissue reaction and the appearance of colonies and organisms presented no distinguishable difference from what has been described for case 1. Again it was noticed that there was considerable variation in the diameter of the coccoid forms, more than one finds in the ordinary types of staphylococci.

Cultures were made from some of the closed globular lesions of this udder in melted dextrose agar according to the method outlined in Jordan's "Textbook of General Bacteriology." Numerous colonies of staphylococci were obtained, together with at least two colonies of a pleomorphic filamentous organism resembling *A. bovis* in appearance. At that time the organisms had not been examined in sections and we were content to conclude, without further cultural study, that this organism was *A. bovis* and to look upon the staphylococci as secondary invaders. Absolute inability to find anything but cocci in a large number of

sections from the lesions has since forced abandonment of this view.

COMMENT

It has long been generally held that actinomycosis was a disease entity caused by a filamentous organism first studied by Harz,⁶ in 1878, and named by him *Actinomyces*. Following him many have contributed to the evidence that this organism is the cause of actinomycosis. It was not difficult to reconcile with this belief the work of Lignières and Spitz, who in 1902 showed that there is an almost indistinguishable disease, actinobacillosis, caused by a small Gram-negative rod, not unlike the colon bacillus, which is now called *Actinobacillus lignièresi*.

It seems that our ideas must undergo considerable revision if they are to conform to the work of Magnusson,⁴ published in 1928, as well as that of Magrou,⁷ in 1919, and several others.

Magrou investigated the etiology of botryomycosis, as found chiefly in the mare's udder and in "scirrhus cord" in colts. In this disease colonies of staphylococci occur in the lesions ensheathed in a hyaline envelope not differing greatly from that seen in the rosettes of actinomycosis. He found that he could reproduce the disease by injecting cultures of these staphylococci under certain conditions, such as with hairs for foreign bodies or in minute doses. But in some of these instances he injected cocci from cases of botryomycosis and obtained lesions of actinomycosis with club-bearing rosettes!

Magnusson found that there are three different types of the condition we know as actinomycosis, depending upon the micro-organism, presumably etiologic, found in each. The first type is that in which the filamentous organism known as *Actinomyces bovis* (also as *Streptothrix israeli*, etc.) is found. This type usually accounts for the cases involving the jaw ("lumpy jaw") and bones in general. J. H. Wright⁸ and many others have furnished evidence of the etiologic significance of this organism. The second type is that in which *A. lignièresi* is found. It has received the name of actinobacillosis. This type includes the cases involving the tongue ("wooden tongue"), other soft parts of the head, and the skin. This portion of his findings very recently has received support from the work of Luther Thompson⁹ in America.

The third type is that in which staphylococci are the apparent causative agent. It is found only in the udder. In the bovine species he has found no other type of actinomycosis in the udder, although he once artificially produced an actinobacillosis of the

udder by intramammary injection of the organisms. In this case, it should be noted, the milk contained "innumerable club-bearing granules."

Magnusson goes on to state that actinomycosis of the udder of the cow, a very rare condition, was first described in 1886 by Sv. Pehrsson, at the Veterinary Congress at Stockholm, and that since then a number of cases have been reported by different observers. He cites eight cases reported by Hülfers and twenty by Gunst in which the conclusions as to staphylococci being the etiologic agent coincided with his own. He also mentions two cases reported by Schlegel, who stated he had found filamentous organisms in the club-encircled granules. Magnusson doubts the correctness of this latter report.

Magrou and Magnusson both look upon the staphylococci found in these cases as one of our everyday varieties (*Staphylococcus pyogenes*, *Staphylococcus aureus*) which has assumed an unusual manner of growth due to peculiarities of environment. Experimental evidence supporting this belief is perhaps furnished by Magrou who was able to obtain lesions and colonies simulating those of actinomycosis by the inoculation, into the testicle of a guinea pig, of a hair dipped in a culture of *Staph. aureus* from a suppurating skin wound of a man. However, the marked variation in the size of the cocci mentioned in the two cases reported in this article was noted by Magnusson, as well as certain other slight differences from common varieties. Furthermore, in some of the cases Magnusson found it necessary to resort to the carbon-dioxid-atmosphere method of Huddleson¹⁰ in order to get cultures to grow, something that certainly is not required with ordinary staphylococci.

The findings as to the apparent etiologic agent in the two cases here reported are obviously in accord with those of Magnusson. Concerning the exact character of the coccoid organisms more evidence would be desirable.

Since botryomycosis is known to occur commonly in the mare's udder, the question arises whether these cases of so-called actinomycosis of the cow's udder were not also botryomycosis. In the two cases described in this report the colonies were surrounded by a hyaline zone, having either definite refrigent clubs or else an indistinct border in which the clubs may be considered imperfect and obscure. In the colonies of botryomycosis the outer border of the hyaline zone is sharp and definite and smooth, showing no tendency to club-formation. This would seem to show a difference between the two conditions.

The relation of a mastitis of this kind to the milk produced and the health of persons drinking it deserves consideration. While the two cases seen were so far advanced that little secretion was produced, there is no reason to doubt that in the incipency of the disease the affected quarter secretes very much as usual. Klein³ states that actinomyces have so far never been demonstrated in the milk, although he believes they must occur there. He states that there is no record of transmission of actinomycosis to man through milk, but nevertheless regards the use of milk from affected cows as dangerous on obvious grounds.

In the two cases here described, the examinations of the milk seem to make it fairly certain that no rosettes, granules, or ray fungi entered the milk. The very thorough encapsulation observed histologically tends to corroborate this. If, however, the causative organisms are the staphylococci, the matter assumes an entirely different aspect, for there were plenty of staphylococci in the milk. Whether and under what conditions these organisms might produce actinomycosis in a person consuming the milk, or whether they might also be capable of producing some of the suppurative conditions that staphylococci ordinarily engender must remain in doubt. Whether, in the sanitary examination of milk for actinomycosis, one should expect to find rosettes or simply cocci can perhaps be determined as more cases come to light and receive investigation.

That these two cases should have occurred on the same farm and in a rather small herd, and that the second victim should have been a daughter of the first furnish interesting material for speculation but the two cases in themselves cannot be regarded as sufficient evidence either of contagiousness or of inheritance of the condition. In the year and one-half which has elapsed since the second case, no others have developed in the herd.

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PYRETHRUM AS AN ANTHELMINTIC FOR ASCARIDIA LINEATA*

By R. E. REBRASSIER, *Columbus, Ohio*

College of Veterinary Medicine, Ohio State University†

Over a century ago, it was discovered that flowers from certain species of the pyrethrum plant would kill various forms of insect life. The powdered flowers of this plant have been exported under various names from certain provinces of Persia and Dalmatia into European countries for use as insecticides. The drug was introduced into America first about the year 1850.

The pyrethrum plant belongs to the genus *Chrysanthemum*, of the family *Compositae*. Ginsburg¹ lists the following species as being toxic for insects: (1) *roseum*, (2) *carneum* and (3) *cinerariaefolium*. The last-named species is cultivated especially for insecticidal purposes because it is higher in insecticidal properties and gives a larger yield of flowers.

Pyrethrum is very poisonous to insects and cold-blooded animals, but is not toxic to man or other warm-blooded animals. Although all parts of the plant are toxic to insects, most of the toxic principle is found in the flower-head. The toxicity is due to two chemical compounds named pyrethrin I ($C_{22}H_{30}O_5$). These compounds are highly insoluble in water but dissolve readily in most organic solvents such as alcohol, acetone, ether and kerosene. The total pyrethrin content of the dried flowers varies from 0.3 to 1.2 per cent. The term pyrethrum refers to the entire plant, while pyrethrin designates only the active principle. Within recent years, pyrethrum has become one of our most valuable insecticides and large quantities of the flowers are imported annually into this country from Japan, Italy and other countries where this plant is cultivated.

Staundiger and Ruzicka² described the active principles of pyrethrum and the toxic action on cold-blooded animals, and stated that oral administration to warm-blooded animals was without danger.

Chevalier³ began internal medication with this drug in man and domestic animals. He found it to be very efficacious in removing ascarids and tenia from dogs, and stated that young dogs would withstand large doses of this drug without apparent discomfort. A dose of 10 mg was found to be sufficient to remove all tenia and ascarids from the dog.

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†In cooperation with the Ohio Agricultural Experiment Station, Animal Disease Laboratories, Reynoldsburg, Ohio.

Urbain and Guillot,⁴ of the French Army Veterinary Service, reported the results of their work on the administration of pyrethrin for the removal of intestinal parasites of horses. Ascarids, oxyurids and strongylids were removed with a formula consisting of 1 gm of the drug in 20 gm of castor oil. These investigators state that the superiority of pyrethrin lies in its definite lethal rather than paralyzing effect upon the parasites, and that the use of laxatives is unnecessary following its administration.

The satisfactory results obtained with pyrethrum in mammals suggested the possibility that this preparation might be efficient in removing intestinal parasites of poultry. A series of tests were conducted to determine the anthelmintic value of pyrethrum for *Ascaridia lineata*.

METHODS

Thirty adult birds, known to be infected with *Ascaridia lineata*, were placed in individual cages having wire-mesh bottoms and removable pans for the droppings. Powdered pyrethrum in gelatin capsules was administered to each bird after feed had been withheld for a period of 12 hours. The droppings were collected in water for a period of 72 hours and examined for the presence of ascarids. Post-slaughter examinations were made at the end of five days following treatment; the intestines were opened and their contents scraped into a vessel containing tap water. Both the scraped intestine and the diluted contents were examined for the presence of *Ascaridia lineata*.

Since no record could be found of the use of pyrethrum for the removal of intestinal parasites in the chicken, an arbitrary dose had to be determined. Based on the work of Chevalier in the dog and cat, it was decided to use 200 mgs of the powdered pyrethrum.

Since the pyrethrin content of the dried flowers varies from 0.3 to 1.2 per cent, it was deemed advisable to use a preparation which contained not less than 0.7 per cent. The assay of the drug used in these tests showed a pyrethrin content of 0.8 per cent.

EXPERIMENTAL DATA

The results obtained by the administration of 200 mgs of powdered pyrethrum (containing 0.8 per cent pyrethrin) for the removal of *Ascaridia lineata* are given in table I. This shows, for each host, the efficacy of the drug against *Ascaridia lineata* as indicated by the percentage of worms removed compared with the total number present.

TABLE I—Anthelmintic value of pyrethrum for *Ascaridia lineata* (200 mg pyrethrum containing 0.8 per cent pyrethrin).

BIRD	ASCARIDIA OBSERVED IN DROPPINGS AFTER TREATMENT				POST-SLAUGHTER OBSERVATION	EFFICIENCY (%)
	12 Hrs.	24 Hrs.	72 Hrs.	TOTAL		
1	8	6	2	16	0	100
2	5	2	0	7	0	100
3	16	6	3	25	0	100
4	9	4	0	13	0	100
5	1	0	0	1	0	100
6	10	2	0	12	0	100
7	8	4	0	12	0	100
8	0	8	4	12	0	100
9	0	2	0	2	5	28.5
10	0	6	4	10	0	100
11	0	10	6	16	0	100
12	4	5	6	15	0	100
13	15	0	0	15	0	100
14	12	0	0	12	0	100
15	8	0	0	8	1	88.8
16	4	8	0	12	0	100
17	8	3	4	15	0	100
18	0	2	3	5	0	100
19	0	0	3	3	2	60
20	0	0	8	8	4	66.7
21	8	1	5	14	0	100
22	2	4	3	9	0	100
23	1	5	10	16	0	100
24	0	4	11	15	0	100
25	0	6	5	11	0	100
26	4	2	4	10	0	100
27	0	0	0	0	4	0
28	3	6	2	11	0	100
29	6	4	8	18	0	100
30	0	8	2	10	1	90.9
Totals	132	108	93	333	17	95.14

In 24 of the 30 birds treated, complete elimination was obtained and only one bird failed to pass worms following treatment. Five birds passed some worms following treatment but did not eliminate all of them.

Birds 15 and 30 passed all worms except one and in each instance the remaining worm was found to be dead when the bird was slaughtered. Birds 19 and 20 passed the majority of worms present but did not have complete elimination. Bird 9 passed only 28.5 per cent of the worms present and bird 27 failed to pass any. It is possible, in the latter case, that the capsule containing the drug may have failed to pass into the crop and was coughed out, although no trace of pyrethrum could be found in the dropping-pan.

The efficacy of pyrethrum against *Ascaridia lineata*, based on the worm total, was found to be 95.14 per cent. A total of 333 *Ascaridia lineata* were removed from the 30 birds treated and 17 were found at post-slaughter examination. The largest number of worms were removed in the first twelve hours following treatment, 132 being recovered. At the end of 24 hours, an additional 108 worms were recovered and 93 were passed between the 24th and 72nd hours.

The foregoing data indicate that pyrethrum (containing 0.8 per cent pyrethrin) has a high efficiency in removing *Ascaridia lineata* from the chicken. It has an added advantage in that no purgative is required.

It is quite possible that pyrethrum may be found to be highly efficient against other species of parasites. Tests are being conducted to determine its efficiency against tapeworms infecting the chicken.

SUMMARY

Powdered pyrethrum in doses of 200 milligrams, containing 0.8 per cent pyrethrin, was administered to 30 adult chickens, to determine the efficiency of the drug in removing *Ascaridia lineata*. The droppings of each bird, voided over a period of 72 hours following treatment, were examined for *Ascaridia lineata*. These birds were then killed and examined for the presence of *Ascaridia lineata*. Twenty-four birds eliminated all *Ascaridia lineata* following treatment and only one bird failed to pass worms. Five birds passed *Ascaridia lineata* but did not completely eliminate them. The efficacy of pyrethrum against *Ascaridia lineata*, based on a worm total, was found to be 95.14 per cent.

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Oldest Musical Instrument

What is believed to be the oldest musical instrument in the world has been discovered on the slopes of the Pollau Mountains in Czechoslovakia, according to *Science*. It is a musical pipe made of a lion's tooth, and sounds a signal in the notes of D and G which still can be played perfectly after 30,000 years.

SOME OBSERVATIONS RELATIVE TO DISEASE IN WILD DEER ENCOUNTERED IN NORTHERN MINNESOTA*

By E. L. GUTSCHENRITTER, Virginia, Minn.

During the spring of 1930, while making a call to a pioneer settler, I noticed a deer crossing the road ahead of me, walking rather aimlessly. It then headed directly into a tree as if blind. The impact seemed to startle the animal, and it wheeled around and ran for a short distance, then stumbled and fell.

I related the incident to the farmer to whose home I had gone to treat a sick horse. He informed me of an experience of his the week previously, similar to mine, with the exception that he had the deer corralled in the driveway of his barn and was feeding the animal with hay, oats and fresh cow's milk. This deer was blind, and at times appeared much bewildered.

Shortly after this, the game warden of this district brought to my office a dead deer for autopsy. This deer had come into town and then ran on to the highway leading into one of the mining locations. There, to the amazement of onlookers, it darted into a high poultry fence, striking the post of the fence with such force as to break the post, in addition to the neck of the deer. The animal was unable to rise, dying in about 15 minutes.

During that week, several reports came to me as well as the game warden, that dead deer had been found in the woods and of the peculiar actions of the young deer. The game warden brought in the dead deer that had killed itself by running into the poultry fence, for autopsy. Nothing of pathologic importance was noted in the abdominal viscera, with the exception of emaciation, no fat being present in the entire cavity. The gastrointestinal tract was practically empty. A peculiar film or opacity of the cornea was noted. This animal was a yearling buck, and all those encountered previously were yearlings.

When turning this deer over, during the autopsy, I noticed a small grub, of the size and appearance of the equine bot, located on the wing of the nostril. The nostril and head were severed. The nasal sinus was greatly inflamed. In the upper portion, near the brain, were found seven other grubs simulating bots, all firmly embedded in the tissues.

*Presented at the meeting of the Northern Tri-State Veterinary Association, Duluth, Minn., December 14, 1933.

During the spring of 1930, I autopsied about half a dozen deer, and in all cases this grub or bot was present. All of them were young deer, the majority being yearlings. The reports which I received from others were that the dead ones were yearlings, with occasionally a two-year-old.

It is my opinion that the deer-fly laid its eggs on or in the nostril of the deer during the summer months the year previous. During the inhalation of air by the deer, the egg was sucked up into the nostril and finally deposited in its resting place where the egg or ovum developed into the larval grub. As it reached the adult stage, it produced pressure on the optic nerve, practically blinding the animal and producing the frenzied condition described. When the larvae were fully developed, the animal would cough or sneeze them from their lodging place. Those animals which were able to dislodge them before starvation overtook them recovered, ever to be on the lookout for the deer-fly during the summer months.

From reports received from farmers, Indians, game wardens and settlers, I estimate that several hundred deer perished in the northern part of Saint Louis County, Minnesota, from this infestation.

A number of these larvae or grubs were forwarded to Dr. C. P. Fitch, University Farm, Saint Paul, Minn. Dr. Fitch incubated them and was able to develop them into another stage of their life cycle. Whether he was able to develop them into flies, I am unable to state. The condition is similar to gid in sheep, with which you are all familiar.

During the 1933 hunting season, I was called to the home of a hunter to examine a two-year-old buck. While skinning the animal, he noticed some peculiarities in the carcass. This animal was greatly emaciated. Beneath the hide were several, large, gas-filled areas. The gas invaded also the muscle. The flesh had a peculiar color. In splitting the head, it was noted that the animal had been infested during the past year with the condition previously described in the deer, as the tissue scars were very evident. No grubs were present, however.

On one of the hind legs was a pronounced scab, immediately above the hock. I believe that, while this animal was recovering from the infestation before mentioned, it was attacked by a wolf, which accounts for the scar on the leg. Possibly the wolf was suffering from tularemia, contracted from biting or eating a rabbit affected with the disease. The deer was inoculated by being bitten by the wolf. The pathological changes present in the deer were, in my judgment, produced by tularemia.

CLINICAL AND CASE REPORTS

UNRECOGNIZED PARASITISM IN A YEARLING COLT*

By L. B. SHOLL, *East Lansing, Mich.*

Michigan State College

The subject is a yearling female Percheron colt of good breeding. On February 24, 1932, the owners consulted a veterinarian and gave the following history. The colt was foaled normally, at full time, and apparently was very healthy for some time after birth. Early in the winter the owners experienced difficulty in getting her to rise. The feed consisted of oats, straw, and Junegrass hay, and the appetite was good. The urine and feces at that time appeared normal. On February 1, 1932, alfalfa was put into the ration in place of the other roughage. Bowel disturbance was noted immediately afterward with soft, sour feces. The animal remained recumbent most of the time, rising with difficulty, and evincing pain in all four limbs while standing.

Siomine compound, powdered nux vomica, gentian, and artificial Carlsbad salts were prescribed by the veterinarian.

A call was made on March 2. The patient was recumbent, rose with difficulty, and showed evidence of generalized muscle and tendon soreness. The gait was stilted, the back arched, and the flanks tucked in. All visible mucous membranes were congested and icteric. Urine excretion was scanty. The feces were firm and coated with viscous mucus. Intestinal peristalsis was sluggish. Extreme tenderness was noted over the asternal ribs, especially on the left side. A diagnosis of hepatitis and enteritis was made, and the above prescription was renewed, with salicylic acid added. Massage of the limbs with mild liniment was advised.

On March 11, there was slight improvement in the bowel movements. The muscles and tendons were still very tender.

On March 17, another veterinarian was called in consultation. A diagnosis of septicemia was agreed upon, and treatment was

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prescribed. After a short time, the patient appeared almost normal and the owners were instructed to discontinue treatment gradually.

The colt was put on pasture. On June 25, the owners found her down. She was very stiff. The visible mucosae were markedly congested. Treatment was renewed and, on June 28, she was brought before a large group of veterinarians for examination. A diagnosis of pyosepticemia was made, and destruction of the animal was advised with the belief that there was no chance for recovery.

Examination: The animal is in rather poor flesh. The conjunctival mucosae are congested and somewhat icteric. The joints of the legs show some swelling, edema and tenderness, and the animal moves with a stilted gait as though in pain. She is killed for autopsy.

The joints of all four legs show some excess synovial fluid which is clear, but no evidence of infection is noted in any of the joints. Some edema is present in the tissues around the joints. The mesenteric lymph-nodes are somewhat swollen and edematous, but all other lymph-nodes are negative. The head and neck are negative. The pleura is negative, and the lungs show only slight congestion. Some edema is noted over the base of the heart.

The anterior mesenteric artery is considerably enlarged and thickened, and the intima is roughened. Some thrombus formation is noted. Five strongyle larvae are removed. The peritoneum over the intestines is somewhat congested, and the peritoneal cavity contains some excess fluid. There is some swelling and softening of the spleen. The pancreas is negative. The liver shows passive congestion and some cloudy swelling. Twelve bots (*Gastrophilus intestinalis*) are present in the stomach, attached at the line between the cardiac and pyloric portions. About one-half inch from the line, in the pyloric portion, there is an irregularly triangular healing ulcer which measures about one and one-half inches on each side. Fourteen *Ascaris equorum* are removed from the small intestine. The intestinal mucosa shows some congestion and some excess mucus. The cecum and large intestine contain a very large number of strongyles. The mucosa shows marked congestion, numerous small hemorrhages, and a few small ulcerated areas. The kidneys, urinary bladder, and genital organs are negative.

The diagnosis is unquestionably parasitism, and the symptoms manifested by the patient were probably due to toxemia. The author deems this case worthy of report, as it illustrates how easily serious mistakes in diagnosis may be made. Examinations

of feces and blood from this animal undoubtedly would have led to a proper diagnosis, and elimination of the parasites would have brought about marked improvement and possibly complete recovery of the colt.

Examinations of feces from the other horses owned by the farmers revealed rather large numbers of eggs, indicating marked strongyle infection in all of them, and treatment was recommended.

COLIBACILLOSIS IN A DOG*

By L. B. SHOLL and C. F. CLARK

Michigan State College, East Lansing, Mich.

The subject of this report is a seven-year-old male Collie dog. After a few days of illness, the dog was taken to a veterinary clinic. Vomiting and gastro-intestinal disturbance led to a diagnosis of gastro-enteritis. Treatment for three days proved ineffective, and the dog was destroyed.

The animal is in fair flesh. The mucosae, skin, and subcutaneous tissues show considerable icterus. The hepatic and mesenteric lymph-nodes show some congestion and edema. All other lymph-nodes are negative. The head and neck are negative. The pleura is negative. Scattered throughout the lungs are numerous small abscesses 1 to 3 mm in diameter. In some areas these have become conglomerate so as to form nodules, somewhat resembling tubercles, about 5 to 10 mm in diameter. Each abscess is surrounded by a zone of inflammation, and those immediately under the pleura appear somewhat elevated. The lungs show some congestion and some anthracosis. The pericardium and heart are negative. The peritoneum shows considerable icterus, and there is some peritonitis with adhesions over the liver. On the diaphragmatic surface of the liver there is a large irregular area about 9 cm in diameter, over which the diaphragm is firmly adherent. From this area and extending entirely through the liver is a conglomerate mass of abscesses, somewhat bulging on both the diaphragmatic and visceral surfaces and covered by connective tissue and numerous tortuous, injected blood-vessels. The individual abscesses are similar to but somewhat larger than those in the lungs. The liver not directly involved by the abscesses shows congestion, considerable degeneration, and some icterus. The gall-bladder and duct are negative. Some congestion and hemorrhagic areas are noted in the mucosae of the stomach and intestines. Both kidneys

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show some chronic interstitial inflammation. The urinary bladder and genital organs are negative.

Cultures from the lung and liver reveal *Eschericia coli communior* to be the etiologic organism.

TRAUMATIC PERITONITIS IN A DOG*

By L. B. SHOLL, *East Lansing, Mich.*

Michigan State College

The subject is a one-year-old female wire-haired fox terrier. She was purchased on October 14, 1932, and appeared normal until October 19, when she became ill rather suddenly. As she had eaten some green apples, the owner naturally thought them to be the cause of the trouble. She was taken to a veterinarian who made a diagnosis of parasitism and dosed her accordingly. On October 21, the condition was much worse, and she was brought to the college clinic for examination. The temperature was subnormal. The pulse was extremely weak, and respirations were shallow. The buccal mucosa was anemic. The dog was in a semi-comatose condition and died about ten minutes later.

Autopsy: The dog is in good flesh. The skin and subcutaneous tissues are negative. The lymph-nodes of the peritoneal cavity show considerable congestion and edema. The head, neck and chest are negative. The peritoneal cavity contains a large quantity of cloudy brownish fluid, and there is marked congestion of the peritoneum over the viscera. The spleen and pancreas are negative. The liver shows considerable congestion, some swelling, and some evidence of degenerative changes. Over the right lobe of the liver there is considerable fibrinous peritonitis, and near the lateral border a double white thread is observed which passes through the wall of the duodenum just below the pylorus, extends around the border to the anterior surface of the liver, and back through the liver to a needle, which is free in the peritoneal cavity. About six inches of the thread still remains in the stomach, the latter showing no gross lesions. Just below the pylorus there is a hole in the duodenal wall about 2 or 3 mm in diameter, through which the double thread passes. A number of ascarids are present in the lumen of the small intestine. The cecum and large intestine are negative except for some congestion. The urinary bladder and genital organs are negative.

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The history in this case is rather misleading. Though the veterinarian was correct in diagnosing parasitism, his examina-

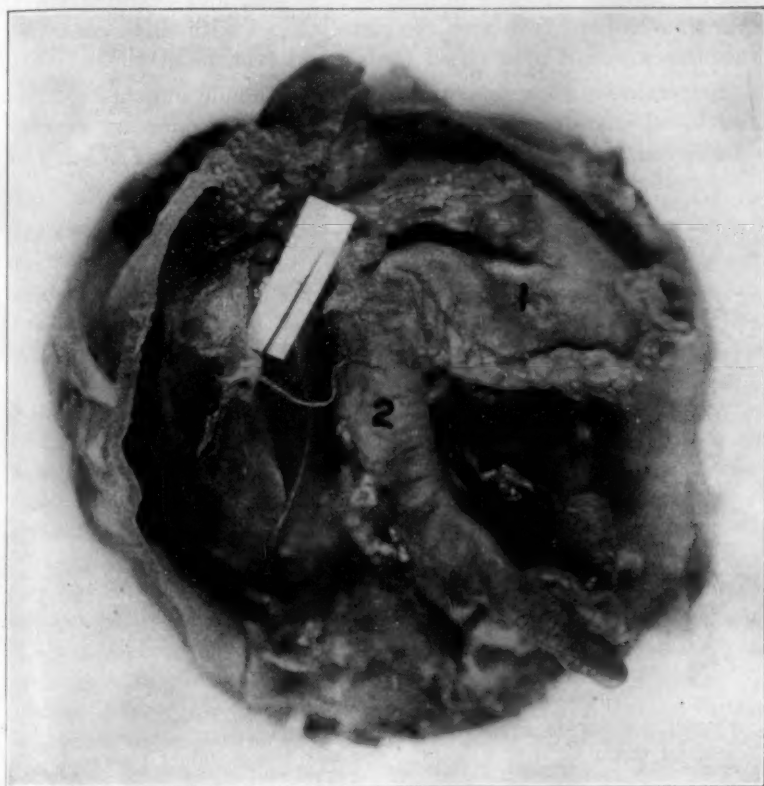


FIG. 1. Traumatic peritonitis in a dog. Thread is seen passing through duodenum (2) and around border of liver (3). Stomach is marked 1.

tion apparently was not complete. The case is rather interesting due to the peculiar course of the needle in passing through the intestine and liver.

DIABETES IN A DOG*

By E. R. CUSHING, *Plainfield, N. J.*

The case is an 8½-year-old bitch, a Collie-Airedale cross, having been spayed at 2½ years of age. For more than a year, prior to presentation for treatment, she had been excessively fat, but for the last four months had lost weight continuously,

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and the last two months she became very emaciated in spite of a ravenous appetite. From the time she began to lose weight, she had shown evidence of impaired vision, and examination at this time showed both eyes completely blind with thick cataracts. Incontinence had been noted for six or seven months.

Suspecting some urinary trouble or metabolic unbalance, urine and blood examinations were made with the following results:

Urine analysis:

Specific gravity	1024
Reaction	Acid
Sediment	Cloudy
Color	Pale straw
Albumen	Negative
Sugar	Present, 4.7 per cent
Acetone	Trace
Diacetic acid	Present, plus

Microscopical examination:

Urates	
Occasional white blood corpuscles	
Slight mucus	
No casts	

Blood examination (qualitative):

Hemoglobin	80 per cent
Hemoglobin	11.1 gm per 100 cc blood
Red blood cells	4,720,000 ($4\frac{1}{2}$ to $5\frac{1}{2}$ million normal)
White blood cells	11,450 (6,000 to 8,000 normal)
Eosinophiles	6 per cent
Stabs	8 per cent
Segments	66 per cent
Lymphocytes	19 per cent
Gr. mononuclears	1 per cent

Blood examination (quantitative):

Blood sugar	361.5 mg per 100 cc blood (normal, 70 to 125)
Blood urea nitrogen	18.8 mg per 100 cc blood
Blood creatinine	2.0 mg per 100 cc blood
Plasma CO ₂	40.5 vol. per cent (this shows a moderate degree of acid-base balance disturbance)

From the above facts, an unfavorable prognosis was given and the owner decided to have the dog destroyed. On autopsy, a search of the abdominal cavity failed to reveal the presence of a typical pancreas. A small mass the size of a walnut was found in the normal location of the pancreas. This was thought to be the degenerated organ, but a microscopic study of this mass showed it to consist of fibrous connective tissue and failed to reveal any histological evidence of pancreas cell element.

Microscopic examination of the kidney showed slight tubular degeneration, and of the liver, marked fatty infiltration.

This is undoubtedly a case of diabetes in a dog. An interesting fact is the apparent absence of a pancreas.

ACKNOWLEDGEMENT

The laboratory work in the case was done by M. G. and J. J. Hanson, of New Brunswick, N. J.

FIVE-DAY-OLD CALF REACTS TO TUBERCULIN TEST

The importance of tuberculin-testing all cattle in a herd, regardless of age, is demonstrated as the result of an initial tuberculin test applied to a herd located in York County, Pennsylvania, under the Modified Area Plan.

The herd, consisting of eight head of cattle, was tested February 21-24, 1934, resulting in four cattle giving positive reactions to the test. A five-day-old calf and the dam of the calf both reacted along with two other cows.

The reactors were slaughtered under federal inspection on March, 1934, and the postmortem examination disclosed lesions of tuberculosis in all animals. The calf and its dam were generalized cases of tuberculosis, were condemned, and tanked as unfit for food purposes.

The calf showed extensive lesions in the lungs, bronchial, mediastinal and portal glands, with miliary lesions in the liver and spleen. Laboratory examination revealed the presence of *Mycobacterium tuberculosis* in confirmation of the above findings.

Some have completed about the requirement for testing calves, especially those coming into Pennsylvania from other states. The results obtained in this calf proved that a young five-day-old calf will not only react to tuberculin, if tuberculous, but is capable of becoming a generalized case of tuberculosis as well.

T. E. M.

Prominent Kansas Alumni

Two veterinarians have been singled out recently for special mention by the *Kansas Industrialist*, published by the Kansas State College of Agriculture and Applied Science. They are: Dr. Walter Wisnicky (K. S. C. '26), Director of Live Stock Sanitation, Wisconsin Department of Agriculture, and Major G. W. FitzGerald, V. C., U. S. A., (K. S. C. '16), of Presidio of Monterey, Calif. The achievements of both are described in interesting and comprehensive biographical sketches, and it is evident that Kansas State College is proud of two such eminent alumni.

REVIEWS



TEXT-BOOK OF MEAT HYGIENE. Richard Edelmann, Royal State Veterinarian of Saxony, and Professor at the Royal Veterinary High School in Dresden. Revised by John R. Mohler, Chief, United States Bureau of Animal Industry, and Adolph Eichhorn, Director, Veterinary Department, Lederle Antitoxin Laboratories. 6th edition. 474 pages, 162 illustrations and 5 colored plates. Lea & Febiger, Philadelphia, Pa., 1933. Cloth, \$5.50.

This standard work really needs no introduction. Neither should it be necessary to make any explanations for the appearance of a new edition. Quite a period of time elapsed between the publication of the fifth edition and the one which has just appeared. As in every other field, changes take place and improvements are made in methods for the inspection of meat and meat products. As practically all meat inspection in the United States—federal, state, county and municipal—is conducted according to the same standards, namely, those of the United States Bureau of Animal Industry, these regulations are set forth in detail and have been brought right up to date. Chapter IV, consisting of 62 pages, is devoted to these regulations. Succeeding chapters deal with the organization and methods of procedure of the inspection force, and decisions of the veterinary inspector on the disposal of the condemned meat.

One chapter is devoted to the examination and judgment of prepared and preserved meats, chickens, game, fish, amphibians and crustaceans. The proper emphasis is placed upon those diseases of food-producing animals that are transmissible to man through meat. The subject of meat poisoning is given proper consideration. Recent developments in dry rendering and quick freezing are covered.

In order to appreciate the scope of an adequate system of meat inspection with all of its many ramifications, one should read this book from cover to cover. Even veterinarians actively engaged in meat inspection will undoubtedly find much new material of interest to them in the sixth edition. Veterinarians not regularly engaged in meat inspection will find the book a valuable reference on numerous occasions.

THE CHOW CHOW. Will Judy, editor of *Dog World*. 185 pages and 90 illustrations. Judy Publishing Co., Chicago, Ill., 1933. Cloth, \$2.00.

It is claimed that this book is the only one devoted to this aristocrat of dogdom, the Chow. In 54 short chapters, Will Judy has made available practically everything that is known concerning this popular breed. These divisions cover origin, history of the breed in various countries, the official standard and its detailed interpretation, care, training, feeding, kenneling, showing and selling, and numerous other subjects.

To veterinarians, it is particularly pleasing to note that the author has seen fit to dedicate the book to a prominent member of the veterinary profession in these words:

To Dr. John Jaffray, of Chicago. Friend and associate, a lover of dogs, a sportsman with the noblest creed, and a distinguished member of the veterinary profession, taking up the work of his father and dedicating his life to the better care of dogs and all other animals, and more particularly to creating an appreciation on the part of dog owners of their obligations to their dogs.

This latest product of the prolific pen of Mr. Judy deserves a place along with the other monographs on breeds of dogs which he has written during recent years.

COCCIDIA AND COCCIDIOSIS OF DOMESTICATED, GAME AND LABORATORY ANIMALS AND OF MAN. Elery R. Becker, Associate Professor of Protozoölogy, Iowa State College. 147 pages, 25 figures. Collegiate Press, Inc., Ames, Iowa, 1934. Cloth, \$2.50.

This is a most useful monograph on a subject concerning which the information has been widely scattered. Every person whose activities bring him in contact with coccidia, and this includes most of the members of the veterinary profession, will find much of interest in this book.

The author clearly explains what is known regarding coccidia, their life cycle, classification, transmission, host-specificity, effect upon the host, immunity, physiology, prophylaxis and therapeutics. He then summarizes present-day knowledge of coccidia and coccidiosis in each animal or group of vertebrate animals in which these protozoa occur.

There are also included a host-catalog of the coccidia having representatives in the digestive tract of vertebrates, notes on technic and a bibliography of 336 references.

Dr. Becker merits the thanks of all who have an interest in this subject.

E. A. B.

ABSTRACTS



THE PROPAGATION OF THE VIRUS OF INFECTIOUS LARYNGOTRACHEITIS ON THE CHORIO-ALLANTOIC MEMBRANE OF THE DEVELOPING EGG. F. M. Burnet. Brit. Jour. Exp. Path., xv (1934), 1, p. 52.

Laryngotracheitis virus may be propagated in the chorio-allantoic membrane of the developing egg. There is a great deal of variation in the macroscopic appearance of the lesions, but the most typical form at the fourth or fifth day after inoculation is probably that of a plaque of grayish thickening in the membrane, surrounded by a zone of whiter appearance about a millimeter wide. In some cases there are several such two-zoned plaques. The lesions produced in the membrane are due primarily to proliferative and necrotic changes in the ectodermal layer; proliferating cells frequently show typical intranuclear inclusions similar to those found in the tracheal lesions. Material from the third and seventh egg generation of virus was inoculated intratracheally into chickens. An emulsion from two eggs (third generation) gave typical symptoms. Birds inoculated from the seventh generation material showed no symptoms but showed definite thickening and inflammation of the tracheal mucosa.

THE DIFFERENTIATION OF THE VIRUSES OF FOWL PLAGUE AND NEWCASTLE DISEASE: EXPERIMENTS USING THE TECHNIC OF CHORIO-ALLANTOIC MEMBRANE INOCULATION OF THE DEVELOPING EGG. F. M. Burnet and J. D. Ferry. Brit. Jour. Exp. Path., xv (1934), 1, p. 56.

Newcastle disease and fowl plague viruses are highly infective for the developing egg, and the use of this technic for their investigation offers a number of advantages. Newcastle disease virus produces a characteristic lesion in the chorio-allantoic membrane, in which cytoplasmic inclusions can be demonstrated histologically. Comparative filtration studies with egg material indicate that Newcastle disease virus is larger (80 to 120 millimicrons) than fowl plague virus (60 to 90 millimicrons). Newcastle disease virus is more resistant to photodynamic inactivation.

tion by methylene blue than fowl plague virus. These differences, in conjunction with the known clinical and immunological differences, point to the complete etiological independence of the two diseases.

THE EFFECT OF VARIOUS TEMPERATURES ON THE EGGS AND LARVAE OF STRONGYLOIDES. J. M. Cordi and G. F. Otto. Amer. Jour. Hyg., xix (1934), 1, p. 103.

The optimum temperature for development of the free-living cycle of strongyloides is about 23 to 30°C. At 10 to 11°C. and at 37 to 40°C. only a few worms completed the free-living cycle, the rate being slower in the former case and accelerated in the latter. Hatching but no further development occurred at 40 to 43°C. but above 43°C. every stage was killed quickly. At 0 to 8°C. an occasional egg hatched but there was no development. Fresh fecal specimens only should be used to determine the presence or absence of strongyloides larvae. Specimens should not be stored in the ice-box before examination.

STUDIES ON THE SUBJECT OF PRENATAL TRICHINOSIS. Donald L. Augustine. Amer. Jour. Hyg., xix (1934), 1, p. 115.

Observations on rabbits, swine, rats and a child, born of trichinous mothers, confirm the conclusion of Stäwbli (1909) that prenatal infection does not occur in trichinosis.

CANINE DISTEMPER. THE DISEASE AND THE NATURE OF THE VIRUS. D. R. A. Wharton and Martha Washburn Wharton. Amer. Jour. Hyg., xix (1934), 1, p. 189.

Distemper is essentially an acute anemia and hypoglycemia. The loss of hemoglobin and sugar is demonstrable a few hours after injection and is independent of the number of erythrocytes, which is also reduced. The erythrocytes decrease immediately or after undergoing a slight rise. The blood of infected puppies is increasingly glycolytic *in vitro* as the disease progresses. The enhanced glycolysis is a function of the virus in the erythrocytes and is independent of the leucocyte changes or of any apparent increase in hemopoietic activity. Infectiousness of blood ceases simultaneously with the inhibition of virus in the blood as manifested by the low point of sugar and hemoglobin having been passed.

The blood of convalescent dogs displays exaggerated glycolytic activity *in vitro*, indicating that the glycolysis-inhibiting factor

has been partly or completely destroyed. The rate of diffusion of sugar injected into the blood is constant and indicates that the surrounding tissues have no part in causing the low sugar levels observed in the disease. The albumin is reduced and the globulin increased; the albumin-globulin ratio falls with the progress of the disease and returns with recovery. The total plasma nitrogen does not vary greatly, but the non-protein nitrogen is subject to appreciable variation. The serum calcium decreases; the inorganic phosphorus increases slightly. The sedimentation rate of the cells is enormously increased and appears to be associated with the specific gravity, acidosis, cell volume and other changes.

The urine shows no signs of serious renal or hepatic impairment which could be responsible for the changes involved in the disease. The addition of virus to normal or infected blood increases the rate of glycolysis. Heated virus inhibits glycolysis. Hyperimmune serum, heated or unheated, added to normal or infected blood, has little influence on the rate of glycolysis, but hyperimmune serum inhibits free extracellular virus. Heated virus and heated antiserum together inhibit glycolysis. The virus of dog distemper is intracellular and affects the glycolytic enzyme as well as the factors controlling the destruction of hemoglobin. In animals free from complications bacteria seldom are found and have no bearing on the cause of the disease.

COMPARATIVE STUDIES ON THE VIRUSES OF VESICULAR STOMATITIS AND EQUINE ENCEPHALOMYELITIS. Peter K. Olitsky, Herald R. Cox and Jerome T. Syverton. *Jour. Exp. Med.*, lix (1934), 2, p. 159.

The virus of stomatitis, ordinarily dermatotropic, can acquire neurotropism and the neurotropic encephalomyelitis virus, in turn, can be rendered dermatotropic in its action. The neurotropism in both instances is associated with definite, although not pronounced viscerotropism. Both viruses can bring about a similar infection in the white mouse, rat, guinea pig, rabbit, and rhesus monkeys. Of these animals rabbits show the lowest degree of susceptibility and mice the highest, especially after intracerebral inoculation. The mouse is highly sensitive to the instillation of the viruses in the nasal passages; a dilution of 1:10,000,000 sufficing to induce a fatal encephalitis. The microscopic changes resulting from the action of both viruses reveal, in rapidly lethal infections, pronounced destructive lesions in the cells of the central nervous system. When the disease is more protracted, these

lesions are associated with beginning productive, inflammatory reactions, consisting chiefly of mononuclear infiltrations. In the latter instances characteristic intranuclear inclusion bodies can be observed more readily. Both viruses can be cultivated with facility in the medium of minced chicken embryonic tissue suspended in Tyrode's solution, although 24- to 28-hour-old chicks are refractory to artificial infection. No cross-immunity reactions occur between the two strains of stomatitis virus or between them and the encephalomyelitis strain.

SWINE INFLUENZA. V. STUDIES ON CONTAGION. Richard E. Shope. Jour. Exp. Med., lix (1934), 2, p. 201.

A strain of swine influenza has been observed to change from a condition of full contagiousness, in which both *H. influenzae suis* and the swine influenza virus were transferred by pen contact, to one of only partial contagiousness, in which the virus alone was transferred, resulting in the mild filtrate disease instead of swine influenza in animals infected by contact. Swine that have been converted experimentally into carriers of *H. influenzae suis* developed swine influenza following contact with animals infected with the altered strain of the disease. Experiments in which the etiological components of a freshly obtained and fully contagious strain of swine influenza were substituted for the corresponding components of the altered strain of the disease revealed the fact that the change in the contagious character of the latter was due to an alteration in the bacterial component of the etiological complex and that the virus component was in no way responsible.

PERIVASCULAR REACTIONS IN LUNGS AND LIVER FOLLOWING INTRAVENOUS INJECTION OF STREPTOCOCCI INTO PREVIOUSLY SENSITIZED ANIMALS. Charles H. Hitchcock, Anthony R. Camero and Homer F. Swift. Jour. Exp. Med., lix (1934), 3, p. 283.

Intravenous inoculation of small doses of non-hemolytic streptococci into previously sensitized rabbits usually is followed by the appearance of perivascular cellular aggregates in lung and liver. The characteristic cell in these aggregates is moderately large, with vesicular nucleus, prominent nucleoli, clumped chromatin, and basophilic cytoplasm. In addition, the lesions contain small lymphocytes and granulocytes. This mononuclear response does not occur when the intravenous dose is large enough to cause death of the animal within 24 hours. In spleen and lymph-nodes the characteristic basophilic cells, which normally occur in these

organs, are present in increased numbers. Following intravenous treatment alone or sensitization without intravenous treatment, the lesions occur much less frequently, and when present are smaller and more sparsely found. It is suggested that the preliminary sensitization serves to enhance the animal's reactivity to the antigen.

THE EFFECT OF HEMOGLOBIN INJECTIONS ON ERYTHROPOIESIS AND ERYTHROCYTE SIZE IN RABBITS RENDERED ANEMIC BY BLEEDING. D. K. Miller and C. P. Rhoads. *Jour. Exp. Med.*, lix (1934), 3, p. 333.

An anemia characterized by increased size of the red blood-cells and a high color index was produced in rabbits by repeated bleeding and by the subcutaneous injection of stroma-free hemoglobin solution. The bone-marrow of these rabbits reverted to a more primitive stage than did the marrows of rabbits rendered anemic in the same manner but not treated with hemoglobin. The animal body apparently possesses a large reserve of stroma-building material under the conditions of the experiments. The animals of the treated series maintained a blood-hemoglobin level higher than that of the controls although the erythrocyte count was somewhat lower than in the controls.

UREA CLEARANCE AFTER UNILATERAL NEPHRECTOMY IN DOGS. Howard T. Karsner, Ramon F. Hanzal and Robert A. Moore. *Arch. Path.*, xvii (1934), 1, p. 46.

With the urea clearance test as a criterion, unilateral nephrectomy is followed by a transient period during which the remaining kidney is physiologically deficient. After six months the remaining kidney functions as well as did both kidneys originally. The enlargement of the remaining kidney of the dog is a true hypertrophy. This result agrees with those of previous experiments on the rabbit by the urea tolerance test and with the results of Ellis and Weiss in man with the urea clearance test.

ATHEROSCLEROSIS IN DOGS. W. D. Zinserling. *Abst. Arch. Path.*, xvii (1934), 1, p. 106.

The aorta and other organs of 28 dogs, from 8 to 28 years old, were studied. In old dogs, spontaneous lipoidosis of the aorta, the interstitial tissue in the sclera, cartilage, tendons and the fibrous capsule of the internal organs was observed. The lipid was deposited in the interstitial substance, while the fatty de-

generation of the tissue cells played a minor rôle. These changes were identical with those observed in man and the rabbit. Characteristic for the dog is the secondary lipoidosis in fibrotic areas of the intima, in contradistinction to the primary lipoidosis of the human aorta. In man and in the rabbit, fibrosis of the aortic wall follows atheromatous degeneration. In the dog cholesteremia does not play the same important rôle of a causative factor of lipoidosis of the aorta as it does in the rabbit. It was impossible to produce lipemia and atherosclerosis in dogs by feeding an excess of cholesterol. In old dogs, endogenous factors seem to produce a disturbance of the cholesterol metabolism which, together with the fibrosis of the aortic wall, must be regarded as the essential cause of atherosclerosis.

THE PATHOLOGY OF PSITTACOSIS IN ANIMALS AND THE DISTRIBUTION OF *RICKETTSIA PSITTACI* IN THE TISSUES OF MAN AND ANIMALS. R. D. Lillie. Abst. Arch. Path., xvii (1934), 1, p. 120.

The lesions of psittacosis in naturally and experimentally infected parrots and parrakeets are described. *Rickettsia psittaci* has been demonstrated in epithelial cells of the small intestine, ureter, renal secreting tubules and bile-ducts, in epithelioid cells, macrophages, reticulo-endothelial cells and mesothelial cells of parrots, in the epithelium of the renal collecting tubules in parrakeets, and in macrophages and alveolar epithelial cells in the lung and in hepatic cells in man. It seems indicated that *R. psittaci* is primarily an epithelial parasite, and enters cells of the macrophage-reticulo-endothelial series, secondarily, as the epithelial cells break down. An etiologic relationship of *R. psittaci* to psittacosis seems indicated, though not proved.

DEFENSE MECHANISMS IN CHICKEN SPIROCHETOSIS. I. L. Kritschewski and P. L. Rubinstein. Abst. Arch. Path., xvii (1934), 1, p. 125.

Chickens infected with *Spirochaeta gallinarum* were killed at different intervals. Histologic examination of the organs with special spirochetal stains revealed that the spirochetes gradually become dissolved after undergoing degenerative changes such as splitting and fragmentation. Phagocytic processes were seen only rarely and apparently do not play an essential rôle in the destruction of the spirochetes. It seems most likely that the destruction of the spirochetes is due to the action of specific lysins.



Regular Army

Each of the following-named officers of the Veterinary Corps is relieved from further assignment and duty at the station specified after his name, effective in time to comply with this order, and will then proceed to Washington, D. C., and report to the commanding general, Army Medical Center, on or about August 28, 1934, for duty for the purpose of pursuing a course of instruction at the Army Veterinary School.

Lt. Col. Burton A. Seeley, Fort Benning, Ga.
Major Henry E. Hess, Fort Hamilton, N. Y.
Major Stanley C. Smock, Fort Hoyle, Md.

First Lt. Harvie R. Ellis is relieved from his present assignment and duty at Fort Riley, Kan., effective at such time as will enable him to comply with this order, and will report on or about August 27, 1934, to the commandant of the Cavalry School for duty as a student in the 1934-35 regular course.

Veterinary Reserve Corps

New Acceptances

Hyde, RoscoeCapt.....402 W. Washington St., Hartford
City, Ind.
Rebrassier, Russell Edmund.Capt.....201 Piedmont Rd., Columbus, O.
Aldrich, Percy Milton.....2nd Lt...R. F. D. 1, Dixie, Wash.
Fuller, Robert Clark.....2nd Lt...P. O. Box 68, Quitman, Ga.
Zacherle, Geo. Henry, Jr....2nd Lt...4905 Pulaski Ave., Philadelphia,
Pa.

Promotions

To

Hiett, Allen Ambler.....1st Lt....R. F. D. 11, Compton Rd., Mount
Healthy, Cincinnati, Ohio.

Colonel Foster to Head Army Veterinary Corps

Col. Robert J. Foster, until recently Station and Division Veterinary Officer on duty at Fort Bliss, Tex., will succeed Col. Walter Fraser as Chief of the Army Veterinary Corps when the latter completes his four-year term of office in that capacity the latter part of April. Col. Foster takes up his new duties in the War Department about May 1.

Following his graduation from the New York State Veterinary College at Cornell University with the class of 1902, Col.

Foster accepted a position as instructor in veterinary science at Clemson College, S. C., where he remained for a year. The following year he spent in the same capacity at the University of Missouri, Columbia, and a third year at Kansas State College, Manhattan. In August, 1905, he was appointed a veterinarian of the 12th U. S. Cavalry, stationed at Fort Oglethorpe, Ga. He served with this regiment at Fort Wm. McKinley, P. I., Fort Robinson, Neb., Fort Meade, S. Dak., and along the Mexican border during the Villa troubles until January, 1916. He was then transferred to duty with the 9th U. S. Cavalry at Camp Stotsenberg, P. I., where he served until the fall of 1917.



COL. ROBERT J. FOSTER, V. C., U. S. A.

Ordered back to the United States because of the World War, Col. Foster was shipwrecked off the coast of Formosa on board the U. S. A. Transport *Thomas*, en route to the United States with the 8th Infantry aboard. Upon his arrival, he was ordered to organize and command the veterinary section of the Medical Officers' Training Camp, at Fort Riley, Kan. In August, 1918, he was ordered to the War Department, at Washington, D. C., for duty as officer in charge of organization and training for the Army Veterinary Corps in the Surgeon General's office. In November, 1920, he was made Chief Veterinarian, Army of Occupation, Coblenz, Germany, and served there until June, 1922.

When Col. Foster returned to the United States, he was made Station Veterinarian and placed in charge of veterinary instruction at the cavalry school, Fort Riley, Kan., until June, 1926. From 1926 to 1929, he served as Department Veterinarian with the Panama Canal Department, at Corozal, Canal Zone. He was then placed on duty at the headquarters of the Seventh Corps Area, at Omaha, Neb. Two years later, in 1931, he was transferred to the First Cavalry Division, at Fort Bliss, Tex., for duty as Station and Division Veterinary Officer.

Col. Foster has been a member of the A. V. M. A. since 1906. He served as Resident Secretary of the Canal Zone from 1926 to 1929, and as First Vice-President of the Association from 1932 to 1933. He was Chairman of the Section on Military Medicine and member of the Committee on Budget for the term, 1932-33. He is at present a member of the Committee on Resolutions. Col. Foster is a Scottish Rite Mason of the Army Lodge of Perfection, Fort Leavenworth, Kan., and a member of Isis Temple Shrine, Salina, Kan.

C. J. N.

DeVine Laboratories Expand

A new laboratory and office building for the J. F. DeVine Pharmaceutical Laboratories, at Goshen, N. Y., is now under construction and is expected to be ready for use shortly. The building is a large two-story stone and concrete structure. The lower floor will contain concrete vaults for the storage of medicines, as well as prescription rooms and test laboratories. The front portion of the upper floor will house a suite of offices and a large display of medicines. The remainder of the floor will be occupied by other departments. There is easy access between the new structure and the buildings now in use.

Pitman-Moore Company Opens New York Branch

The Pitman-Moore Company, of Indianapolis, Ind., opened a branch in New York, N. Y., March 1, 1934, according to attractive announcements received by friends and patrons of the company. The address of the new branch office is 330 West Thirty-fourth Street.

Eastern Depot for Haver-Glover

The Haver-Glover Laboratories, of Kansas City, Mo., announce the opening of a depot in New York City to give prompt service to patrons in eastern territory. The address is 10 West 33rd Street, in the Waldorf Building.

TWELFTH INTERNATIONAL VETERINARY CONGRESS

Waldorf-Astoria Hotel, New York, N. Y.
August 13-18, 1934

OFFICERS

Chairman of the Organizing Committee: Dr. A. Eichhorn.

Vice-Chairman: Dr. L. A. Merillat.

Treasurer: Dr. John R. Mohler.

General Secretary (to whom all communications should be addressed):
Dr. H. Preston Hoskins, 221 N. La Salle St., Chicago, Ill.

Membership Campaign

The campaign for memberships in the Congress is now in full swing. Illinois continues to lead the other states in the number of applications filed, with California a close second. Ohio jumped from seventh to third place, and Pennsylvania moved from eleventh place into fourth position, just nosing out New York, which is now fifth. Massachusetts retains sixth place. Colorado jumped from twelfth position to seventh. The standing, as of March 24, is as follows:

Illinois	57	Colorado	24
California	53	Missouri	24
Ohio	46	Dist. of Columbia.....	23
Pennsylvania	41	Connecticut	15
New York	39	Kansas	14
Massachusetts	28	New Jersey	12

Applications from twenty different foreign countries already have been received. The leading countries are as follows:

Japan	11	South Africa	7
Canada	9	Switzerland	5
Egypt	8	Spain	3

Finances

Since the listing of the contributions to the Congress in the March issue of the JOURNAL, additional contributions totaling \$875 have been received from state and provincial associations. To date, two provincial, five local and 17 state associations have given financial evidence of their interest in the Congress. Others that have voted appropriations but have not sent them in are urged to do so at the earliest opportunity.

Contributions received since the previous listing are:

California State Veterinary Medical Association.....	\$ 500.00
Illinois State Veterinary Medical Association.....	200.00
Mississippi State Veterinary Medical Association.....	25.00
Northwestern Ohio Veterinary Medical Association.....	100.00
Saskatchewan, Veterinary Association of.....	50.00
Previously acknowledged.....	4,047.00

\$4,922.00**Dr. Du Toit to Be at Congress**

A cablegram, received on March 17, from Dr. P. J. Du Toit, Director of Veterinary Services for the Union of South Africa, brought the good news that he would be in attendance at the Congress to present his report on anaplasmosis in person. There will be few, if any, of the delegates to the Congress who will be obliged to travel a greater distance in coming to New York than will Dr. Du Toit, whose official headquarters are at Onderstepoort, Union of South Africa. It took a letter just 32 days to reach Chicago from Onderstepoort.



DR. P. J. DU TOIT

Dr. Du Toit is a comparatively young man, having just passed his 46th birthday. He holds degrees from Victoria College (B.A., 1907), University of Zürich (Dr. Phil., 1912), Berlin Veterinary High School (Dr. Med. Vet., 1916) and University of Stellenbosch (D. Sc., 1931). His early training was in zoölogy, which admirably prepared him for his later studies in veterinary science. In 1919 he was appointed Sub-Director of Veterinary Education and Research, and Professor of Infectious Diseases on the Faculty of Veterinary Sciences of the University of South Africa. In 1927 he was appointed to his present position.

Dr. Du Toit is a member of many scientific bodies and has served as Chairman of the Sixth Pan-African Veterinary Congress at Pretoria (1929), President of Section M (Agriculture) of the British Association for the Advancement of Science (1930), President of the South African Veterinary Medical Association (1924-30), and in numerous other important offices.

Dr. Du Toit was an official delegate to the London Congress in 1930.

British National Committee Active

A preliminary grant of £250 toward paying the expenses of reporters and delegates to the Congress has been offered by the Finance and General Purposes Committee of the National Veterinary Medical Association of Great Britain and Ireland, subject to the approval of the Council of the Association. This fund should be increased to at least £1,000 by subscriptions and donations, the Committee feels.

An appeal has been issued to divisions of the N. V. M. A., and other groups, and to individual members of the profession for contributions to the fund. In addition, letters have gone out to students' unions of colleges, local authorities and agricultural institutions, appealing for members in the Congress.

Veterinary Record, January 27, 1934.

Congress Notes

Dr. Norman Wright (Ont. '07), Lecturer in Veterinary Science at the University of Saskatchewan, Saskatoon, has been appointed delegate from the Veterinary Association of Saskatchewan to the Twelfth International Veterinary Congress.

Dr. C. D. McGilvray (Ont. '00-Mc-K. '01) will be the official delegate of the Ontario Veterinary College, Guelph, Ontario, Canada.

Prof. Dr. B. S. Parkin, of Pretoria, South Africa, has been selected as the official delegate of the South African Veterinary Medical Association.

Dr. J. O. Wilson (O. S. U. '08) reports that every veterinarian on the B. A. I. Field-Yards force at Denver, Colo., has filed his application for membership in the Congress.

Dr. F. C. Kraneveld, of the State Veterinary Institute, Buitenzorg, Java, Dutch Indies, forwarded his report on "Anaerobic Diseases of the Domestic Animals in Netherlands, India," by air mail. It left Buitenzorg on February 27 and was received in Chicago on March 17. Eighteen days!

Dr. C. M. Haring (Corn. '04) will represent the University of California.

Dr. F. R. Beaudette (K. S. C. '19) has been designated as the delegate from the New Jersey State Agricultural College and Experiment Station.

MISCELLANEOUS



Veterinarian Appointed Manager of Humane Department

As additional evidence of the expanding field of veterinary activities, the JOURNAL takes pleasure in announcing the appointment of Dr. C. C. Warn (McK. '11) to the position of general manager of the Humane Department of the City of Los Angeles, the largest such department in the United States. Dr. Warn was engaged in practice in Los Angeles for about fourteen years.



DR. C. C. WARN

Prior to going to California, he was located in Wisconsin, where he was sheriff of his county for several years. Dr. Warn has been a member of the A. V. M. A. since 1916. He is a member of the California State and Southern California Veterinary Medical associations, and the Los Angeles Veterinary Hospital Association.

Virginia Veterinarian Elected to Legislature

Dr. Heath La Rue Lyon (San Fran. '14), of Hillsville, Va., was elected a member of the House of Delegates, the lower branch of the Virginia Legislature, at the November election. He is now serving on the following committees of the General Assembly: Agriculture and Mining, Asylums and Prisons, Manufactures and Mechanic Arts, and Officers and Offices at the Capitol.



DR. H. L. LYON

Born at Hillsville, July 20, 1883, Dr. Lyon attended the Fairview Male and Female Academy, the National Business College of Roanoke and the San Francisco Veterinary College. He started practicing in Hillsville in 1915.

An Instructive Exhibit

In order that dairymen might have a graphic and practical illustration of the losses in cattle caused by the ingestion of nails and pieces of wire, a model cow, four feet high, was designed by Dr. L. F. Conti, of the Los Angeles County Live Stock Department, and placed on exhibition at two fairs and live stock shows.

The viscera were modeled to scale in their natural position, and a cleverly designed, motor-driven mechanism furnishes life-like motion to the jaws, heart, diaphragm and reticulum. A nail passing through the reticulum and diaphragm impinges on the heart, and with each impulse shows clearly the manner in which the injury occurs in the field.

Literature carrying the head, "A 'Wireless' Appeal for the Cows," describing the economic importance of this condition and giving suggestions as to its prevention was distributed to those interested, and attractive posters and displays of pathological material attracted hundreds of dairymen. The display, which afforded opportunity for the veterinarians in charge to contact these stock-owners and discuss the various disease-control projects which the department supervises, has received very favorable comment in California newspapers and agricultural journals.



A "WIRELESS" APPEAL FOR THE COWS.

Lien Laws

"An Act to create a lien for certain biologicals furnished and services rendered in the favor of licensed veterinarians, and providing for the foreclosure thereof," has been passed by the General Assembly of the State of Iowa. Governor Clyde L. Herring set his signature to the Act on March 10, 1934. This is the second law of its kind to be passed, the first having been put into effect by South Dakota in 1931.

The Iowa Law may be said to be an improvement over that of South Dakota, in the following particulars:

It provides that the veterinarian shall have a lien for the actual and reasonable value of any biological product used, in addition to the value of the services rendered.

It covers "any contagious live stock disease," whereas the South Dakota Bill covers only cholera, anthrax and blackleg.

It extends the time limit for the filing of liens from 20 days (in South Dakota) to 60 days.

It provides that the lienholder may enforce his lien by a suit in equity, a fact not mentioned in the South Dakota Law.

Copies of these laws may be obtained by writing to the office of the A. V. M. A.



DR. R. F. VERMILYA

New N. A. B. A. I. V. President

The National Association of Bureau of Animal Industry Veterinarians elected a new president at the annual meeting held in Chicago in December. He is Dr. R. F. Vermilya (Chi. '06), of Boston, Mass. A firm believer in organized veterinary medicine, Dr. Vermilya has been a member of the A. V. M. A. since 1908. He is now in charge of meat inspection at Boston, and previously served in a similar capacity at Detroit, Mich., and Wheeling, W. Va.



SOUTH DAKOTA VETERINARY MEDICAL ASSOCIATION

The annual meeting of the South Dakota Veterinary Medical Association was held at the Cataract Hotel, Sioux Falls, December 14-15, 1933. President Carl B. Lenker, of Colome, presided over all sessions.

The address of welcome was given by Mr. J. M. Morris, president of the Sioux Falls Chamber of Commerce. Mr. Morris stressed the interest that all live stock growers must have in the welfare of the practicing veterinarian. A gracious response was made by President Lenker, following which the strictly business part of the session was held.

The vacancy on the program caused by the illness of Dr. Thomas H. Ruth, director of the Department of Animal Industry, Pierre, was filled ably by Dr. C. H. Hays, of Pierre. Dr. W. E. Donahue, of the Sioux Falls Department of Health, talked interestingly on the need for coöperation on the part of the veterinary, the dental and the medical professions. He said that by such coöperation a great amount of knowledge could be gained by each concerning the diseases that are transmissible from animal to man.

Dr. Otto J. Schrag, of Freeman, gave a report on corn-stalk poisoning, a disease that has caused an enormous loss to South Dakota during the past year, due to drouth. This report was followed by an enthusiastic discussion. Dr. C. P. Fitch, president of the A. V. M. A., and chief of the Division of Veterinary Medicine, University of Minnesota, showed motion-pictures of experiments in introducing sodium nitrite into the system by oral administration, as well as the results obtained by the use of this chemical compound given intravenously. Both the pictures and the talk that accompanied them were greatly appreciated by the members.

Dr. Carl F. Schlotthauer, of the Mayo Foundation, Rochester, Minn., gave a paper on canine practice. He showed also motion-

pictures of surgical operations in canine practice, which were well received. A paper on obstacles met with in sales-pavilion inspection was presented by Dr. H. D. Perry, of Yankton. This brought up a discussion as to whether pigs should be tattooed at the time they are vaccinated, to prevent the promiscuous use of vaccination certificates for animals not entitled to them. This method, it was contended, would help to prevent the heavy losses now sustained in the absence of adequate protection against this fraud.

Promptly at 6:30, the doors of the banquet hall were opened and about 100 veterinarians, their wives and friends sat down to a sumptuous banquet, presided over by Dr. C. H. Hays, as toastmaster. Dr. C. P. Fitch, the speaker of the evening, gave an interesting talk on the activities of the American Veterinary Medical Association. At the conclusion of his talk, he presented a motion-picture on a strange disease of moose in the northern woods.

The second-day session was opened with a demonstration on cattle, by Dr. O. C. Selby, of Mankato, Minn., assisted by Dr. N. J. Mayer, of Mitchell. Dr. Frank Breed, of Lincoln, Neb., gave a splendid paper on swine diseases. Dr. F. D. Blohm, of Huron, chairman of the Investigating Committee, reported that his Committee had produced several sworn affidavits on reported quack practice in South Dakota, especially around Huron. Other committee reports were presented at this time. A new committee—that on international relations—was approved, the seven members to be appointed by the President. Dr. M. S. Thorpe, of Esterline, was voted to membership in the Association.

Speakers on the afternoon program were: Dr. J. D. Ray, of Kansas City, Mo., who spoke on enteritis in swine; Dr. E. D. Sadler, of Wagner, who presented a case report on an injury found in a heavy draft horse; and Dr. C. P. Fitch, whose subject was "Bang's Disease." Dr. Fitch also showed lantern-slides picturing the agglutination test as it is performed in Minnesota. This talk, which was outstanding in every respect, brought to a close one of the best programs ever presented before South Dakota veterinarians.

The ladies, through the courtesy of the commercial veterinary firms in the territory, were entertained with a luncheon at the Carpenter Hotel and with a theater party afterward.

Officers chosen for the coming year are: President, Dr. H. J. McCauley, Beresford; vice-president, Dr. R. G. Elliott, Aberdeen; secretary-treasurer, Dr. G. E. Melody, Hoven (reëlected).

G. E. MELODY, *Secretary*.

VETERINARY MEDICAL ASSOCIATION OF NEW JERSEY

The Fiftieth Anniversary meeting of the Veterinary Medical Association of New Jersey was held at the Hotel Douglas, Newark, January 4-5, 1934, with President W. B. Maxson, of Flemington, presiding. The attendance was large, and the papers and discussions were timely and interesting. Dr. C. P. Fitch, president of the American Veterinary Medical Association, contributed two excellent talks to the program.

The following papers were presented during the meeting: "Some Common Eye Conditions Met with in Small-Animal Practice," by Dr. W. C. Ecker, of Newark; "Trichomoniasis in Relation to Reproduction in Dairy Cows," by Dr. M. A. Emmerson, University of Pennsylvania, Philadelphia, Pa.; "Equine Encephalomyelitis, with Special Reference to Mosquitoes as Vectors," by Lt. Col. R. A. Kelser, V. C., U. S. Army, Boston, Mass.; "The Control of Bang's disease," by Dr. C. P. Fitch, Chief, Division of Veterinary Medicine, University of Minnesota, Saint Paul, Minn.; "Predisposing Causes of Canine Distemper," by Dr. Orville E. McKim, Port Chester, N. Y.

The Anniversary dinner, on the evening of January 4, was a pleasant occasion, although overshadowed by the death of Dr. William Herbert Lowe, on December 31, 1933. Dr. Lowe had been the principal founder of the Association, in 1884, and had served in many capacities throughout his life. It had been expected that he would take an active part in the Anniversary celebration.

The following guests were present at the dinner, at which Dr. Arthur W. Smith, of West Orange, was toastmaster: Dr. C. P. Fitch; Dr. Carl TenBroeck, Director, Rockefeller Institute, Princeton; Dr. G. A. Dick, Dean, School of Veterinary Medicine, University of Pennsylvania, Philadelphia, Pa.; Mr. H. W. Jeffers, President, State Board of Regents, Plainsboro, and Mr. William B. Duryee, Secretary, State Department of Agriculture, Trenton. Dr. John B. Hopper, of Ridgewood, a past president, reviewed the history of the Association in his able manner, suitable short speeches were made by the guests, and reminiscences of the early days of the Association were given by past presidents, seven of whom were present: Drs. W. F. Harrison, J. B. Hopper, H. C. Miller, R. E. Mosedale, J. H. McNeil, A. W. Smith and T. E. Smith. The principal talk of the evening was given by Dr. Fitch, following which he showed an interesting motion-picture film on "Diseases of Moose."

At the business session on January 5, a resolution was adopted endorsing the principles of the proposed revision of the federal Food and Drugs Act, as contained in the so-called "Tugwell Bill," for which Senate Bill 2000 has now been substituted. President Maxson was designated as the Association's delegate to the A. V. M. A. House of Representatives, the Secretary to serve as alternate. Dr. James T. Glennon, of Newark, was made a life member of the Association.

At the clinic session, Dr. R. J. Garbutt, of New York, N. Y., demonstrated the Thomas splint as modified by Schroeder for treating fractures of the femur in dogs. Drs. D. A. Yandell and W. R. Ecker, of Newark, demonstrated several operations, including the removal of the canine teeth in dogs, and the use of the "cat splint."

The following officers were reelected for 1934: President, Dr. W. B. Maxson, of Flemington; first vice-president, Dr. E. R. Cushing, of Plainfield; second vice-president, Dr. C. J. McAnulty, of Atlantic City; secretary, Dr. J. G. Hardenbergh, of Plainsboro. Dr. J. B. Engle, of Summit, was named treasurer to succeed Dr. Harry Ticehurst, of Shrewsbury.

J. G. HARDENBERGH, *Secretary.*

CHICAGO VETERINARY MEDICAL SOCIETY

The regular monthly meeting of the Chicago Veterinary Medical Society was held at the Hotel La Salle, Chicago, Ill., January 9, 1934. Dr. Roy Kegarris gave an interesting talk on x-ray technic. Officers elected to serve during 1934 are: President, Dr. C. N. Bramer, Evanston, Ill.; vice-president, Dr. R. L. Tinkham, Chicago; secretary-treasurer, Dr. O. Norling-Christensen, Chicago, (reelected).

O. NORLING-CHRISTENSEN, *Secretary.*

INDIANA VETERINARY MEDICAL ASSOCIATION

The annual meeting of the Indiana Veterinary Medical Association was held at Indianapolis, January 16-18, 1934, and was considered by the majority of those in attendance to be one of the best and most instructive held in recent years.

Considerable Hoosier talent was prevailed upon to discuss several important subjects relating directly or indirectly to veterinary practice. Dr. D. D. Baker, of Wabash, gave a masterly presentation of the subject, "Swine Practice." Many veterinar-

ians will read Dr. Baker's treatise on this important subject with interest and appreciation. Dr. R. G. Brooks, of Farmland, with equal care and enthusiasm, presented a treatise on poultry diseases and practice, demonstrating not only his knowledge of the subject but also the possibilities of profitable income and enhancement of the position of the practitioner with his clientele. Dr. W. F. King, of Indianapolis, former health commissioner of Indiana, ably discussed some of the animal diseases that are pathogenic for man. He emphasized undulant fever and rabies, and presented evidence to show the unwarranted losses from rabies and the tremendous cost of treating individuals exposed to the disease.

Prof. Aaron Todd, of the Purdue University Agricultural Experiment Station, discussed the feeding and management of poultry, and Prof. E. F. King, of the same station, presented several new thoughts on the practical feeding of beef cattle and swine. Dr. J. L. Axby, Indiana's genial State Veterinarian, not only discussed state laws and regulations relating to live stock and veterinary practice, but demonstrated his tactfulness and ability as toastmaster at the banquet, which more than 175 veterinarians, their wives and friends attended.

Dr. C. P. Fitch, president of the American Veterinary Medical Association, paid the meeting a short visit and discussed some phases of Bang's disease and other important subjects in which the general practitioner should be interested. Dr. C. D. Barrett, of Akron, Ohio, made many friends and created unusual interest by the clever way in which he discussed phases of small-animal practice.

The importance of equine practice and the increased demand of farmers to salvage as much power as possible from the present number of horses and mules were emphasized by Dr. L. A. Merillat, of Chicago, Ill., in his discussion of lameness and diseases of horses. Dr. H. D. Bergman, of Iowa State College, appeared before the Association for the first time and, although a stranger, by his genial personality together with his ability to discuss physiology, ruminatorics and blood chemistry, won his audience completely. The thanks of the Association are extended to him and to all others who took part in the program.

The Association voted to affiliate with the A. V. M. A., and elected Dr. J. L. Axby as its delegate to the House of Representatives. Dr. H. W. Demsey, president of the Association, conducted the proceedings in a businesslike manner and made a number of timely suggestions in his opening remarks.

Newly-elected officers for the coming year are: President, Dr. H. E. Bryan, Angola; vice-president, Dr. L. C. Finley, Lapel; secretary-treasurer, Dr. W. B. Craig, Indianapolis (reelected).

R. C. JULIEN, *A. V. M. A. Res. Sec. for Indiana.*

MARYLAND STATE VETERINARY MEDICAL ASSOCIATION

The winter meeting of the Maryland State Veterinary Medical Association was held at the Medical Hall, Baltimore, January 24, 1934, with 70 in attendance.

The meeting was called to order by the President, Dr. Walter E. Campbell, of Bel Air. In a short address, Dr. Campbell stressed the need for close coöperation between veterinarians and allied professions. The first paper of the day, "Serums, Vaccines and Immunity," was given by Dr. L. J. Poelma, of College Park. Many things of classroom days were recalled, and much that was new in this general field was explained and discussed.

Dr. R. H. Riley, director of the Maryland State Department of Health, in his paper, "Relationship of the Veterinarian to Public Health Work," showed a keen appreciation of the rôle the veterinarian plays in the prevention of human disease. He discussed in detail the diseases, such as rabies, tuberculosis, Bang's disease and others, in which the veterinarian represents the first line of defense against human infections. Several of the various points brought out were discussed by Drs. James W. Hughes, of Elkton; J. P. Turner, of Washington, D. C.; N. N. Crawford and W. G. Chrisman, of Baltimore, and others.

Considerable interest was aroused in the eradication and control of intestinal parasites in horses, through the short talks given by Drs. Benjamin Schwartz and W. H. Wright, of Washington, D. C. Dr. F. W. Cruickshanks, of Hagerstown, gave three interesting case reports from his practice. This topic, always of timely interest, was ably presented and fully discussed.

Through the courtesy of Dr. Hulbert W. Young, luncheon was served at the cafeteria of the Western Maryland Dairy.

The afternoon session was devoted to equine encephalomyelitis. Dr. A. L. Brueckner, of College Park, read a comprehensive paper, giving the background of this infection and the results of the findings in Maryland during the serious outbreak of 1933. Dr. F. S. Wharton, of Centerville, discussed the disease from the field point of view, and described several of his cases in detail.

At the business meeting, Dr. C. L. Butler, of Easton, and Dr. J. F. McClure, of Hyattsville, were elected to membership. Officers were elected for the coming year as follows: President, Dr. R. C. Reed, College Park; first vice-president, Dr. F. S. Wharton, Centerville; second vice-president, Dr. T. A. Ladson, Olney; secretary-treasurer, Dr. Mark Welsh, College Park (reelected). Dr. R. V. Smith, of Frederick, was reelected to the Executive Committee for a five-year term.

MARK WELSH, *Secretary*.

MINNESOTA STATE VETERINARY MEDICAL SOCIETY

The thirty-seventh annual meeting of the Minnesota State Veterinary Medical Society was held at the Hotel Saint Francis, in Saint Paul, January 25-26, 1934. The attendance was splendid, with 175 veterinarians registered. President A. C. Spannaus, of Waconia, presided at all regular sessions.

The literary program was interesting and instructive. Dr. C. P. Fitch, as president of the A. V. M. A., made a short address in which he recounted some of his impressions and experiences obtained in his travels and associations with veterinarians and veterinary organizations in various parts of the country. Dr. Reuben Hilty, of Toledo, Ohio, distinguished himself with a notable paper on "Equine Practice." Dr. S. L. Stewart, of Olathe, Kan., read a paper on "Bang's Disease in Cattle," in which he advocated the use of living vaccines on pregnant cows as a method of controlling this disease. Dr. Stewart's paper was followed by a spirited discussion.

Dr. D. D. Baker, of Wabash, Ind., read a paper on the subject of "Swine Diseases." Dr. Baker stressed the matter of mineral and chemical poisons as factors of importance among the numerous ailments affecting swine. A paper entitled, "Some Historical Notes on Contagious Pleuro-Pneumonia," by Dr. J. P. Foster, of Minneapolis, brought out the fact that it is now 41 years since the last case of this disease was destroyed in the United States. Dr. V. J. Robinson, of Minneapolis, became very eloquent when speaking of some of the "Do's and Don'ts" that he learned during a period of 25 years in the practice of veterinary medicine.

Drs. D. L. Halver, of Shakopee, and E. W. Berg, of Saint Paul, presented two interesting case reports pertaining to horses. These cases were discussed under the general heading of "Locomotoric Disturbances." They were illustrated with motion-pic-

tures. A motion-picture film, illustrative of the bot control campaign being undertaken by the U. S. Department of Agriculture, was shown. Drs. F. C. Mann and C. F. Schlotthauer, of the Mayo Foundation, Rochester, showed a film illustrating certain operative technic in animals.

A dinner meeting, at which both light entertainment and a literary program were featured, was held Thursday evening, with 150 in attendance. A troupe of entertainers delighted the spirit of levity in the diners. After the entertainment, Dr. J. Arthur Myers, of the University of Minnesota Medical School, gave an illustrated address on "Tuberculosis in Mankind." Throughout his address, Dr. Myers praised the veterinarians, particularly for their work in the eradication of tuberculosis in live stock. Dr. W. H. Feldman, of Rochester, discussed "So-Called Skin Lesions in Tuberculosis-Reacting Cattle."

Dr. R. Fenstermacher, of Saint Paul, reported for the Committee on Infectious Diseases; Dr. J. N. Campbell, of Truman, for the Committee on Colleges, and Dr. G. S. Failing, of Winona, for the Committee on Milk Inspection. Each presented a very interesting committee report which was freely discussed. Dr. M. R. Higbee, of Albert Lea, was elected the representative from Minnesota to the first meeting of the House of Representatives of the A. V. M. A.

Officers elected for the coming year are: President, Dr. P. H. Radford, of Slayton; first vice-president, Dr. P. H. Riede, of Mabel; second vice-president, Dr. R. A. Merrill, of Clara City; secretary-treasurer, Dr. C. P. Fitch of University Farm, Saint Paul. Dr. C. O. Eliason, of Benson, was reelected a member of the Executive Board.

H. C. H. KERNKAMP, *Acting Secretary.*

NEVADA STATE VETERINARY ASSOCIATION

The annual meeting of the Nevada State Veterinary Association was held at the University of Nevada, Reno, January 27, 1934.

The meeting was convened at 1 p. m., and was adjourned immediately, to permit the members of the Association to attend, in a group, the funeral of Dr. Robert Dill, a charter member of the Association and former secretary of the Nevada State Sheep Commission, who died January 24, 1934.

The guest of honor and the principal speaker on the literary program was Dr. George H. Hart, of the University of California,

who spoke, at the afternoon meeting, on "Deficiency Diseases and Studies of the Problems of Nutrition," and, in the evening, on "Sex Hormones." Other speakers on the afternoon program were Dr. Edward Records, of the University of Nevada, who spoke on "The International Veterinary Congress," and Dr. L. R. Vawter, also of the University, who spoke on "Highlights of the Intermountain Live Stock Sanitary Association Meeting at Ogden, Utah." The annual dinner was held at the Hotel El Cortez at 6 p. m. The evening session was called to order at 8 o'clock. In addition to Dr. Hart, other speakers were Dr. Warren B. Earl, of Reno, whose subject was "The Chicago and Davis Meetings," and Dr. G. T. Woodward, of Fallon, who led a discussion of encephalomyelitis.

Officers elected for the coming year are: President, Dr. G. T. Woodward, Fallon; vice-president, Dr. F. H. Baker, Gardnerville; secretary-treasurer, Warren B. Earl, Reno. Dr. Woodward was named delegate to the A. V. M. A. House of Representatives and Dr. Earl, alternate.

WARREN B. EARL, *Secretary.*

ALABAMA SHORT COURSE FOR GRADUATE VETERINARIANS

The Short Course for Graduate Veterinarians held at the College of Veterinary Medicine of the Alabama Polytechnic Institute, Auburn, February 6-10, 1934, was attended by veterinarians from a number of states.

The lectures and operations were confined largely to dogs and poultry. Dr. D. A. Eastman, of Moline, Ill., did all the work on dogs. He gave a lecture on and performed an operation according to Mann's method of entero-anastomosis; removed the cecum from a dog; performed ovariectomies in the bitch and cat, and tenotomy in the dog; described diagnosis and treatment of gastro-enteritis in dogs and cats and treatment of various kinds of parasitic skin diseases. He also gave a lecture on the treatment of dogs for distemper and described the newer methods of immunizing pups against distemper. He did a number of tonsillectomies on dogs. He also described the Cedar Rapids (Iowa) method of preventing rabies in dogs. This method is unique and most successful in eradicating rabies from a city.

Dr. F. D. Patterson gave lectures on leukosis and held post-mortem examinations on a number of chickens having the blood

type, the nerve type and the eye type of this most troublesome disease in poultry. He also gave lectures on tuberculosis in chickens. He tuberculin-tested a number and demonstrated the technic and the reactions. He gave postmortem examinations on a number of tuberculosis reactors.

Dr. H. W. Sawyer read a paper on "Heart Worms in Dogs," giving the life history of the *Filaria*, and all of the newer methods of treatment. Methods of examining the blood for the larvae of *Filaria* were demonstrated. The life history in all of its stages is not known definitely. Specific remedies are not known, although some temporary cures have been reported for certain stages of infestation. Most of these remedies are made from tartar emetic or antimony and potassium compounds. Some are injected into the blood-stream and others have produced results by injection into the muscles. Some veterinarians have claimed good results from giving arsenic compounds by way of the digestive tract.

Dr. H. M. O'Rear, of the Tuberculosis Eradication Division, U. S. Bureau of Animal Industry, Washington, D. C., read a paper on the methods and technic of tuberculin injections in cattle. He demonstrated his methods before all the veterinarians present. One of the chief claims of Dr. O'Rear is that proper methods and technic will eliminate most of the no-lesion reactors in tuberculosis eradication.

Many operations were done and discussions were brought out for the benefit of veterinarians in practice. The banquet given by the Student Veterinary Medical Association was attended by more than 100, and was enjoyed by everyone.

The Tuesday night session was devoted entirely to meat inspection. The first question under discussion was on "Who Can Do Efficient Work and Protect the Public from Bad, Diseased or Spoiled Meat?" The chief requirement of a meat inspector is that he must be a graduate of a recognized veterinary college. Second, the college should give him a thorough and complete course in pathology. Third, he must have a thorough course in all the diseases of meat-producing animals. Fourth, he must be given a good course in the practice of meat-inspection work in a slaughter-house. Fifth, he should have a practical knowledge of all the diseases of animals that are liable to be transmitted to man by infected or infested meat products. The speaker and the audience all agreed that the graduate veterinarian is the only one qualified to do safe meat inspection.

The Wednesday night session was devoted entirely to milk inspection. The first speaker, Dr. E. S. Winters, gave a brief talk about how to count or estimate the number of white, red and

other kinds of cells in the blood of animals. The second speaker, Dr. R. G. Isbell, described in detail some of the methods of making a count or estimate of the number of living bacteria in milk samples. It was brought out that nearly all of the methods employed are not absolutely accurate and that most of them should be rated as estimates.

The one most commonly employed in state and federal laboratories is the standard colony count method as adopted by the American Public Health Association. The factors controlling the number and kind of bacteria in milk are: (a) freedom of milk-producing cows from disease, (b) cleanliness of cows, barns and all dairy processes and utensils, (c) sterilization of all milk containers, (d) keeping milk cool from dairy to consumer, (e) sterilization, pasteurization and the use of chlorin and other chemical preparations in milk (all of which are more or less injurious to the quality of the milk), (f) placing too much stress upon the bacterial count that gives the quantity and no attention or consideration to quality or kind of bacteria in milk, (g) giving more attention to the kind of bacteria, diseases of the cows, and more frequent inspections of the dairies and the cows.

In closing, the question was brought up as to who may do dairy inspection. Again it was decided that the graduate veterinarian is best prepared and qualified to do milk inspection. He knows the diseases of the cow and can regulate all other factors better than the doctor of medicine, the dairy graduate, the sanitary engineer or the layman. If trained, the technician may make bacterial counts and the dairy graduate may help keep the dairy clean. But any and all of the requirements for efficient milk inspection may be done best by the graduate veterinarian and he must be taught and prepared for this work by the veterinary college. The veterinarians in the U. S. Army do all of the meat and milk inspection for the Army—why not for the public? The only reason why it is not done—as in the Army—in all the cities, counties and states is politics.

The Alabama Veterinary Medical Association met on Friday evening, February 9. The Association voted to affiliate with the American Veterinary Medical Association, and elected a delegate and an alternate to represent Alabama at the next meeting of the A. V. M. A., to be held in New York, in August, in connection with the Twelfth International Veterinary Congress. The following officers were elected for the ensuing year: President, Dr. F. P. Woolf, Montgomery; vice-president, Dr. J. H. Ryland, Selma; secretary-treasurer, Dr. C. A. Cary, Auburn.

C. A. CARY, *Secretary.*

VETERINARY MEDICAL ASSOCIATION OF NEW YORK CITY

The regular monthly meeting of the Veterinary Medical Association of New York City was held at the New York Academy of Medicine, February 7, 1934.

Dr. A. Eichhorn, President, introduced the guest and speaker of the evening, Dr. Maurice C. Hall, Chief, Zoölogical Division, U. S. Bureau of Animal Industry. Dr. Hall delivered a fascinating illustrated lecture on the topic, "Planning Campaigns Against Parasites." The method of presentation was entirely novel. Dr. Hall based the formation of his subject matter and charts on army tactics found under the heading of "Organization of the Army." In Army regulations, this subject is divided into three principal sections: theater of operations, or combat zone; lines of communication; and zone of the interior, or non-combatant area.

In the combat zone, Dr. Hall placed the practitioner as the infantry, and the federal, state, county and city authorities as the artillery. The communication service consisted of books, the press, the radio, pamphlets, supply houses and similar groups. In the zone of the interior is found an intelligence service, consisting of research men from federal, state, county, city and college forces.

In discussing the various campaigns being fought, Dr. Hall presented the human as well as the animal side. The human campaigns presented were yellow fever, malaria, tapeworm, trichina, pinworm, hookworm, amebiasis and hydatid. The animal campaigns were against the Texas fever tick, *Anaplasma*, ox warble, scab mite, sheep stomach worm, *Anoplocephala*, liver fluke, horse bots and heart worm in dogs.

To control any parasitic infection, proper disposal of fecal material is essential, and, for this reason, the medical profession is more successful in combating parasites than is the veterinary profession, said Dr. Hall. In some instances, campaigns cannot progress because of political interference or inadequate artillery forces. It is evident, however, that Dr. Hall's forces are fighting and winning many battles and that gradually it will be possible to make greater strides to control or win campaigns which appear doubtful now. Control is a most important measure in our work, and to sever the enemy lines of communication Dr. Hall urged that strict sanitary measures must be maintained at all times, along with proper disposal of carcasses and feces. Dr.

Hall's lecture was instructive and interesting, and heartily received by an overflow audience.

Dr. W. H. Kelly, of Albany, president of the Accredited Veterinarians Association, explained the situation pertaining to the unwritten examination held last fall, and told of steps that would be taken to rectify the condition now existing. He also reported on the distribution of money allotted for tuberculosis work in New York State.

Dr. R. W. Gannett, of Brooklyn, was appointed chairman of a committee to meet with Mr. Horner, of the State Board of Regents, to discuss the control of advertising for the veterinary profession along lines similar to that recently instituted for the dental profession. Other members of the committee are: Dr. Bruce Blair, Dr. R. J. Garbutt and Dr. R. S. MacKellar, Sr., of New York; Dr. L. W. Goodman, of Great Neck, L. I.; Dr. S. Shapera, of Westchester, and Dr. F. W. Andrews, of Mount Kisco.

A committee, consisting of Dr. J. E. Crawford and Dr. R. S. MacKellar, Sr., was appointed to select a new and more centrally located meeting place for the convenience of out-of-town members.

R. S. MACKELLAR, JR., *Secretary.*

HUDSON VALLEY VETERINARY MEDICAL SOCIETY

The regular quarterly meeting of the Hudson Valley Veterinary Medical Society was held at Albany, N. Y., February 14, 1934. Following luncheon at Jack's Restaurant, President R. H. Spaulding, of White Plains, called the meeting to order. Two applicants were admitted to membership.

The speaker of the day was Dr. H. J. Milks, of the New York State Veterinary College, and president of the New York State Veterinary Medical Society, who discussed "Recent Developments in Therapeutics" and "Small-Animal Practice." A recognized authority on these topics, Dr. Milks cited many interesting facts about the early use of drugs in treating disease, and pointed out that some common medicaments had been in use for centuries, usually long before reasons for their efficacy were understood. For example, Marco Polo used crude oil in the treatment of mange in the thirteenth century. Digitalis and quinin were in use as early as 1600. Sedatives, however, are of a later period, most of them having been in use less than a hundred years.

Dr. Milks referred to the wide use of groups of drugs for a period and their replacement by others, as one of the peculiari-

ties of therapeutic history. Some survive, however, and still have an important place in modern medicine. The importance of correct diagnosis before attempting treatment was stressed; also that results vary greatly in individuals and districts in apparently similar troubles treated the same way. Reference was made to the lack of definite information on many disease problems, to differences among experts as to causes of certain types of disease such as skin troubles, and lack of agreement as to whether they are due to internal or external causes.

The discussion was enthusiastic, and several important points were brought out. Drs. Knapp, Moore and Parker led the discussion.

J. G. WILLS, *Secretary*.

LOUISIANA VETERINARY CONFERENCE

The third annual Louisiana Veterinary Conference was held at the Dalrymple Memorial Building, Louisiana State University, Baton Rouge, February 14-15, 1934, under the auspices of the Department of Animal Pathology of the University. A splendid attendance was recorded. Dr. James Monroe Smith, president of the University, welcomed the visiting veterinarians, for whom the response was made by Dr. Hamlet Moore, of New Orleans.

Contributing largely to the success of the Conference were three guest speakers: Dr. C. H. Covault, of Iowa State College; Dr. R. C. Dunn, of Texas Agricultural and Mechanical College, and Dr. C. B. Cain, of Mississippi State College.

Dr. Covault's discussions were confined to large-animal practice. Of great interest to the practitioner was a lecture, accompanied by a demonstration, on the genital diseases of the bovine. He also went into the subject of how the veterinarian could regain a part of the equine practice that has fallen off considerably in the past few years. Acetonemia proved to be a popular topic with the assembly. Dr. Covault presented a vivid word-picture of this condition and gave methods for its prevention and control.

Dr. Dunn gave a demonstration on the prevention and control of poultry diseases as found in the South. He also gave many valuable points on the raising and feeding of chickens. He emphasized the fact that poultry production should be included in the field of veterinary medicine, and showed how the veterinarian could use poultry practice as a point of contact for other fields that would prove more profitable. At another period, Dr. Dunn gave an excellent demonstration of simple field technic that could be used by the veterinarian.

Dr. Cain gave an excellent address on "Some Economic Factors Influencing the Veterinary Profession." He used illustrations that were applicable to conditions in the South, and his address was well received.

A motion-picture film entitled, "Equine Encephalomyelitis," was presented at the annual banquet. The film was obtained through the courtesy of Dr. Karl F. Meyer, of the Hooper Foundation, University of California. This film is of great educational value as it presents this disease as found under field conditions.

At the conclusion of the Conference, a meeting of the Louisiana Veterinary Medical Association was held. The usual business was transacted and the following officers elected for the ensuing year: President, Dr. Harry Morris, Louisiana State University; vice-president, Dr. H. H. Baur, Monroe; secretary-treasurer, Dr. H. A. Burton, Alexandria (re-elected).

HARRY MORRIS, *Reporter.*

VETERINARY ASSOCIATION OF MANITOBA

The forty-seventh annual meeting of the Veterinary Association of Manitoba was held at the Marlborough Hotel, Winnipeg, February 9, 1934.

The business session held in the morning was presided over by President F. C. Bishop, of Dauphin. The registrar's report showed 101 active and 14 honorary members. Financial reports showed a small balance. A resolution was passed to raise the membership dues.

Chief speaker at the afternoon session was Mr. J. H. Evans, Deputy Minister of Agriculture for Manitoba. Mr. Evans stressed the difficulties encountered by stock-owners in these times, due to the low prices prevailing, in being unable to avail themselves of the services of the practicing veterinarian. Large areas of the Province are now without the services of competent practitioners, he said, and the day may be not far distant when it may be found necessary to put into effect some system of state veterinary service for the prevention or control of losses among live stock.

Prof. R. A. Wardle, of Manitoba University, presented an interesting paper on "The Relation of Zoölogy to Veterinary Medicine." A closer coöperation of the study of zoölogy with veterinary science would be a decided advance in the cause of science, he pointed out. It is a cause for regret, he said, that

there exists no veterinary college in Manitoba that would permit an interchange of students in the two courses. Dr. J. A. Allen, of Winnipeg, presented a paper on "Fluke Diseases in Northern Manitoba Sledge Dogs." The paper was illustrated with slides which revealed that apparently a new species of liver fluke is infesting sledge dogs in the northern part of the Province, causing considerable losses. Dr. R. H. Lay, of Winnipeg, read an interesting paper on "The Health of Animals Branch," outlining briefly the provisions of the Animal Contagious Diseases Act and the regulations made under the Act for the protection of the health of live stock and measures taken for the eradication and control of the diseases scheduled under the Act.

In the evening, a banquet was held in honor of Dr. Alfred Savage, Dean of the Faculty of Agriculture, Manitoba University, and a prominent and active member of the Veterinary Association of Manitoba for a number of years. Dr. R. H. Lay presided at the banquet and spoke highly of the part taken by Dr. Savage in advancing the cause of veterinary science. Addresses were made by Drs. O. McQuirk, J. A. Allen, J. K. Morrow, J. G. MacDonald and M. T. Lewis. The toast of the evening to Dr. Savage was made by Dr. W. A. Shoults and was very suitably responded to by Dr. Savage in a splendid address.

Officers chosen for the coming year are: President, Dr. R. H. Lay, Winnipeg; vice-president, Dr. J. K. Morrow, Winnipeg; secretary-treasurer-registrar, Dr. Wm. Hilton, Winnipeg. Board of Examiners: Dr. R. H. McEwen, Stonewall; Dr. H. H. Ross, Brandon; Dr. J. K. Morrow. Auditors: Dr. H. J. Tingle and Dr. A. M. McFarlane, Winnipeg. Council members: Drs. Alfred Savage, R. H. Lay, Wm. Hilton, J. K. Morrow, H. H. Ross, H. R. McEwen; and Dr. O. McQuirk, Dauphin.

WM. HILTON, *Secretary*,

NORTHEAST KANSAS VETERINARY SOCIETY

The Northeast Kansas Veterinary Society was organized March 1, 1934, when a group of 40 veterinarians met at the Hotel Jayhawk, in Topeka, for that purpose. An excellent program was presented. The meetings of the Society will be held quarterly.

Officers elected were: President, Dr. R. F. Coffey, Topeka; vice-president, Dr. I. J. Pierson, Lawrence; secretary-treasurer, Dr. E. H. Lenheim, Topeka.

E. H. LENHEIM, *Secretary*.

NECROLOGY



JAMES McDONOUGH

Dr. James McDonough, formerly of Montclair, N. J., died in Florida, February 6, 1934, at the age of 78. Funeral services were held, February 11, at the residence of his son, James, of Boonton, N. J.

A graduate of the American Veterinary College, New York City, in 1891, Dr. McDonough was in active practice in Montclair for many years. He specialized in lameness and orthopedic shoeing. On frequent occasions, he appeared before veterinary associations to talk on these subjects.

Dr. McDonough first joined the A. V. M. A. in 1892. While engaged in practice, he was an active member and staunch supporter of the Veterinary Medical Association of New Jersey and served as treasurer of the organization for a number of years. Dr. McDonough was a man of splendid character, and beloved by all of his professional acquaintances. He was affectionately called "Mac" by his friends, all of whom will remember his spontaneous outbursts of wit.

Dr. McDonough had been a widower for a number of years and divided his time in visiting his children and grandchildren, having four sons and two daughters, all of whom are married.

J. P. L.

HARRY GIESKEMEYER

Dr. Harry Gieskemeyer, of Fort Thomas, Ky., died February 7, 1934, after an illness of ten days. Pneumonia was the cause of death.

Born in Newport, Ky., March 26, 1881, Dr. Gieskemeyer was a life-long resident of Campbell County. He attended Saint Xavier College for two years and then entered the Cincinnati Veterinary College, from which institution he was graduated in 1912. Later, he served as a member of the faculty.

For the past eight years, he had been associated in practice with Dr. J. A. Winkler (Cin. '18), one of his students at the

Cincinnati Veterinary College. They operated a veterinary hospital in Newport.

Dr. Gieskemeyer joined the A. V. M. A. in 1919. He served as a member of the Committee on Local Arrangements for the Lexington meeting in 1926. He was a member and past-president of the Kentucky Veterinary Medical Association. He was a past-president of the Campbell County Optimist Club and took an active part in the social and civic activities of the community. He was one of the organizers of the Newport Commercial and Civic Association and served on the Board of Directors of the organization.

In his earlier days, Dr. Gieskemeyer had been a noted bicycle race rider and had won many trophies in this sport. He was very fond of dogs and had been a breeder and exhibitor of Scottish terriers for many years. He officiated quite frequently as veterinarian at dog shows held in Cincinnati. He is survived by his widow (née Alvina Deister), two sisters and one brother.

FRED E. ANDERSON

Dr. Fred E. Anderson, of Findlay, Ohio, died at his home, February 22, 1934. He had been afflicted with a heart ailment for some time, but apparently had regained his usual good health. Two days before his death, he became ill again and death came unexpectedly after he had retired for the night.

Born at Carey, Ohio, April 1, 1864, Dr. Anderson spent his early life about the same as the average farm boy of that period. He entered the Ontario Veterinary College and was graduated in 1886. He returned to Carey, where he practiced before going to Findlay the first of the following year.

Dr. Anderson joined the A. V. M. A. in 1900. He served as Resident Secretary for Ohio (1901-1902). He was one of the earliest members of the Ohio State Veterinary Medical Association, and had been on the honor roll of that organization since 1911. He served the Association in various capacities from president (1902-03) down the line, on various committees from time to time, and was always to be found on the firing-line whenever he was asked to perform any service for his chosen profession. His judgment was always sound and his advice was always valuable. He was also a member of the Northwestern Ohio Veterinary Medical Association.

Dr. Reuben Hilty, of Toledo, Ohio, in commenting on the death of Dr. Anderson, paid him the following tribute:

Dr. Anderson, I believe, was the best practitioner of veterinary medicine that I have seen at work. In the treatment of his patients, he used medicine with rare intelligence. He was a man who studied constantly and was modern in every way. He won and held the confidence of his clients by telling them the truth and by doing his work in a careful and painstaking manner.

I shall never forget a remark he once made to me on one of my many visits to his office. I remarked that I hoped that some day I might have the confidence of a clientele such as the confidence which his clients seemed to have in him. He immediately made this reply: "Tell them the truth for 22 years and you'll have it." He had been in practice for 22 years at that time. Such advice is the best that any young practitioner can have. It has done me a great deal of good over a great many years.

Dr. Anderson took an active interest in Masonry and for many years had been a member of the 32nd degree of that Order. He had been a member of the Elks and of the Rotary Club but had resigned his memberships in these organizations about two years ago because of his failing health. He leaves his widow (née Laura E. Moses), one son and one daughter.

WILL C. BOWDEN

Dr. Will C. Bowden, of Hutchinson, Kan., died August 9, 1933, following the rupture of his appendix. He was a graduate of the Kansas City Veterinary College, class of 1910, and practiced for a time at Ness City, Kan.

JESSE CLAY WILKES

Dr. Jesse Clay Wilkes, of McCredie, Kan., died at the Mount Vernon Sanitarium, Mount Vernon, Mo., January 2, 1934, after an illness of several months. He was a graduate of the Kansas City Veterinary College, class of 1916, and had been postmaster of McCredie for several years before his death.

FRED W. PHILP

Dr. Fred W. Philp, of Dodgeville, Wis., died at Saint Joseph's Hospital, February 27, 1934, at the age of 69. He had been in poor health for several years and had been confined to his bed for several weeks before his death.

Born in Canada, Dr. Philp was graduated from the Ontario Veterinary College in 1890. He located first in Mineral Point,

Wis., and remained there until 1921, when he removed to Dodgeville.

Dr. Philp joined the A. V. M. A. in 1909. He is survived by one sister and two brothers, one of whom is a veterinarian, Dr. David R. Philp (Ont. '05), of Mankato, Minn.

JOHN KENNETH BUHR

Dr. John K. Buhr, of Marion, Wis., died at Mercy Hospital, Oshkosh, February 28, 1934, following an operation for a ruptured appendix.

Born July 3, 1895, at Marion, Dr. Buhr spent his entire life in that community. He attended local schools, was graduated from the Marion High School in 1914 and from the McKillip Veterinary College in 1918.

Dr. Buhr served in the Army during the World War. He was active in the work of the local post of the American Legion. He was Post Historian and had served as Post Adjutant.

Just a few hours before his death, Dr. Buhr was notified of his appointment as postmaster of Marion. He had served for ten years as village clerk. He is survived by his widow (née Nan Haycock), five children, his parents, six sisters and one brother.

JOHN D. FAIR

Dr. John D. Fair, of Millersburg, Ohio, died suddenly March 6, 1934, while on a professional call near Benton. Although he had been suffering from hiccoughs for eight days, physicians were of the opinion that heart disease was the cause of death.

Born on a farm in Holmes County, Ohio, February 28, 1863, Dr. Fair attended local grade and high schools and the Millersburg Normal School. He then decided to study veterinary medicine and entered the American Veterinary College in New York City. He was graduated in 1887 and entered practice at Berlin, Ohio. In 1912, Dr. Fair moved to Millersburg where he continued in active practice until the time of his death.

Dr. Fair joined the A. V. M. A. in 1888. He served as Resident Secretary for Ohio (1911-1915). He was a member and past-president (1894-96) of the Ohio State Veterinary Medical Association, and it is reported that he had not missed an annual meeting of the organization during the past 47 years. His name was placed on the honor roll in 1912. For 16 years, Dr. Fair

served as a member of the Ohio State Board of Veterinary Medical Examiners.

Dr. Fair was also a progressive farmer. He developed a variety of corn known as Fair's Yellow Dent, which enjoyed widespread popularity in Ohio. He had been a member of every agricultural society established in Holmes County since 1888. He was a charter member of the first Holmes County Agricultural Society and served on its Board of Directors. Two years ago, he was made a life member. Dr. Fair was a director of the Commercial and Savings Bank and president of the Holmes County Savings and Loan Company of Millersburg, a trustee of the Methodist Episcopal Church, and a charter member of the Millersburg Rotary Club. He was chairman of the Holmes County Relief Fund and county chairman of the Y. M. C. A. drive during the World War. He was also president of the Joel Pomerene Memorial Hospital fund.

Dr. Fair is survived by his widow (née Emma Ruth Hitchcock) and one daughter.

A. H. DABBELT

Dr. A. H. Dabbelt, of Coldwater, Ohio, died at the Miami Valley Hospital, Dayton, Ohio, March 4, 1934. On February 8, Dr. Dabbelt underwent an operation for the removal of a part of his stomach, which was seriously ulcerated. His condition was seemingly good and he was thought to be improving until February 27, when he suffered a relapse.

Born at Saint Sebastian, Ohio, May 26, 1884, Dr. Dabbelt was graduated from the Cincinnati Veterinary College in 1915, and had practiced his profession in the vicinity of Coldwater for the past 20 years.

Dr. Dabbelt joined the A. V. M. A. in 1928. He was a member of the Ohio State Veterinary Medical Association and of the Northwestern Ohio Veterinary Medical Association. He was also a member of the Knights of Columbus and the Lions Club. He is survived by his widow (née Agnes Schmitterman), five sons, two daughters and two brothers.

G. W. L.

De WITT CLINTON SMITH

Dr. DeWitt C. Smith, of Frankfort, Ind., died at his home, March 6, 1934, following a stroke of paralysis two days previously.

Born near Cipio, Ind., May 28, 1859, Dr. Smith attended local schools and then taught school in Decatur County before he decided to study veterinary medicine. Following his graduation from the American Veterinary College, in 1892, Dr. Smith located in Frankfort. For a number of years he was associated in practice with the late Dr. Isam E. Scripture (Amer. '93). He is survived by his widow (née Birdie Fulkerson), one sister, and several nieces and nephews.

HENRY HENNING

Dr. Henry Henning, formerly of New York City, died January 21, 1934, in the Masonic Home at Utica, N. Y. The cause of his death was arteriosclerosis.

Born in Germany, March 29, 1857, Dr. Henning attended the Royal Gymnasium at Nuremberg, before coming to the United States at the age of 12. He was a graduate of the New York College of Veterinary Surgeons, class of 1888. For a number of years thereafter, he was house surgeon at the institution. Later he was professor of veterinary anatomy and surgery, as well as secretary of the veterinary faculty of the New York State Veterinary College at New York University and curator of the Museum. In his teaching of anatomy, Dr. Henning gained the reputation of being a wizard in that subject.

Dr. Henning joined the A. V. M. A. in 1918.

THOMAS G. VAN PETTEN

Dr. Thomas G. Van Petten, of Leroy, Ill., was found dead in his office the morning of March 3, 1934.

Born in Colfax, Ill., January 28, 1890, Dr. Van Petten attended local grade and high schools and then entered the Chicago Veterinary College. Following his graduation in 1914, he practiced at Cooksville, Farmer City, Bloomington and DeWitt, before locating in Leroy. His widow (née Ruth Beckwith) and his mother survive.

CLAUDE L. McKIBBON

Dr. Claude L. McKibbon, of Culleoka, Tenn., died at his home, March 15, 1934, after an illness of a week due to pneumonia. He was 40 years of age.

A native of Culleoka, Dr. McKibbon attended local schools and then studied veterinary medicine at the McKillip Veterinary

College in Chicago. He returned to Culleoka where he combined farming with the practice of his profession. He had been an assistant state veterinarian for the past three years.

Dr. McKibbon is survived by this widow (née Anne Wilkes) four daughters, three brothers and two sisters. The pallbearers were all veterinarians.

M. J.

HARVEY A. SMELTZER

Dr. Harvey A. Smeltzer, of Baldwin, Wis., died at his home, March 15, 1934, following a lingering heart ailment.

Born in Goshen, Ind., December 8, 1878, Dr. Smeltzer spent the early part of his life in Goshen and Elkhart, Ind. He was graduated from the Grand Rapids Veterinary College with the class of 1912, and located for general practice in Baldwin, Wis. In 1927, he became engaged in coöperative tuberculosis eradication work in Wisconsin. During the past year he had been located at Fremont.

Dr. Smeltzer joined the A. V. M. A. in 1918. He was a member of the Odd Fellows and the Masons. Burial was made at Elkhart, Ind. Surviving are the widow (née Bertha Yeoman), one daughter and one brother.

OTTO FREDERICK HOEKZEMA

Dr. O. F. Hoekzema, of McBain, Mich., died in Mercy Hospital, Cadillac, Mich., March 16, 1934. Two days before his death, Dr. Hoekzema was attacked and seriously injured by an enraged bull that he was treating.

Born in The Netherlands, April 17, 1882, Dr. Hoekzema came to the United States as a boy of 10. He attended the public schools of Grand Rapids, Mich., Ferris Institute and the Grand Rapids Veterinary College. Following his graduation from the latter institution in 1909, he located at McBain and practiced there until the time of his death.

Dr. Hoekzema joined the A. V. M. A. in 1915. He was also a member of the Michigan State Veterinary Medical Association. He is survived by his widow (née Martha Starling) and four sons.

JAY M. JENNINGS

Dr. J. M. Jennings, of Warsaw, Ind., died at his home March 21, 1934. Death was caused by a stroke, which resulted from cerebral hemorrhage. He had been ill for only two days, although

his health had been failing for the past few years and he had been forced to retire from active practice. He was in his 60th year.

Born at Saint Joseph, Mich., Dr. Jennings was a graduate of the Indiana Veterinary College. Following his graduation in 1914, he located in Warsaw for general practice. He also won considerable distinction as a dog fancier. Surviving Dr. Jennings are his widow, two daughters and three brothers.

WILLIAM CROSBY ORR

Dr. William C. Orr, of Dillon, Montana, died on March 24, 1934, in a Butte hospital, as the result of injuries received in an automobile accident, near Melrose, two days previously.

Born July 7, 1873, on a ranch east of Dillon, Dr. Orr received his early education in the Dillon schools. He later took a classical course at the University of Nevada and completed his veterinary training at the Ontario Veterinary College with the class of 1894. He practiced in Dillon for several months after his graduation, and in 1896 became veterinarian in charge of the Bitter Root Stock Farm, owned by Mr. Marcus Daly, at Hamilton, Mont. In this position, he succeeded the late Dr. M. E. Knowles, who left to become State Veterinarian for Montana. During the next three years, Dr. Orr did much to improve Thoroughbred horses, for which the Daly ranch was noted. Later he served as deputy state veterinarian. His ability to diagnose and treat lameness in the horse was widely recognized by the racing fraternity, and many horses were shipped to him for treatment from all parts of the country.

When Dr. Orr returned to Dillon, after his graduation in 1894, there were only two other graduate veterinarians in the State. The three formed the Montana Veterinary Medical Association, which met once a year in Helena, at the time of the State Fair. This custom was continued until 1920, during which time the Association had grown considerably in numbers. Dr. Orr served a number of terms as president of the organization. In 1926, he was elected sheriff of Beaverhead County, and had twice since been reelected.

Dr. Orr joined the A. V. M. A. in 1913. He was a member of the Board of County Commissioners, a city councilman and a member of the School Board of Dillon. He was a past commander of St. Elmo Commandery, Knights Templar, a past master of Dillon Lodge No. 16, A. F. & A. M., past patron of Mizpah

Chapter of the Order of the Eastern Star, a member of the Royal Arch Masons, Bagdad Temple of the Shrine, and treasurer of Dillon Lodge No. 1554, B. P. O. E. He is survived by his widow (née Aura Cummings), two daughters and four brothers.

A. C. M.

GEORGE DIXON MILLER

Dr. George D. Miller, of Newark, Ohio, died at his home, March 21, 1934, aged 74 years. He was a graduate of the Ontario Veterinary College, class of 1885, but had not been in active practice for some time.

Our sympathy goes out to Dr. John B. Bryant, of Mount Vernon, Iowa, in the death of his father recently.

PERSONALS

MARRIAGES

DR. R. S. SMILEY (O. S. U. '19), of Tiffin, Ohio, to Miss Louise Heighway, of Bluffton, Ohio, February 20, 1934, at Tiffin.

DR. O. E. THOMAS (O. S. U. '28), of Granville, Ohio, to Miss Gladys Maxwell, of Granville, March 20, 1934.

DR. L. D. MERSCH (Iowa '28), of Fairfax, Minn., to Miss Laverna Keicker, of Fairfax, February 10, 1934, at Minneapolis, Minn.

BIRTHS

To DR. and MRS. E. H. BERETTA, of Solon, Iowa, a daughter, Joan Kathleen, March 8, 1934.

To DR. and MRS. G. A. ROBERTS, of Christiansted, Virgin Islands, a daughter, Martha Emma, March 19, 1934.

PERSONALS

DR. J. J. THOMAS (U. P. '17), is now with Harrisburg Abattoir, Harrisburg, Pa.

DR. FRED R. RASMUSSEN (Ont. '33), has located at Wabasso, Minn., for general practice.

DR. HORACE A. MILLS (K. S. C. '27), of Sussex, N. J., has removed to Newton, same state.

DR. WILLIAM G. DUNCAN (Colo. '32), of Kiowa, Colo., has removed to Englewood, same state.

DR. U. G. HOUCK (U. P. '95), of Washington, D. C., was reported to be seriously ill the past month.

DR. E. W. ALMQUIST (Wash. '32), of Beaverton, Ore., is now located in Hillsboro, same state.

DR. E. H. GLOSS (Iowa '31), formerly of Alexandria, Minn., is now located at Gaylord, Minn.

DR. LAUREN L. BECHTOL (O. S. U. '32), of Okolona, Ohio, has removed to Bryan, same state.

DR. T. F. BARTLEY (Iowa '33), formerly of Butterfield, Minn., has located at Vesta, same state.

DR. I. ZIMMERMAN (Gr. Rap. '06), formerly of Bridgeport, Conn., is now located in New York, N. Y.

DR. H. H. SHEELER (Wash. '20) has moved from Watsonville, Calif., to Huntington Park, same state.

DR. CHARLES F. VAN DE SAND (Chi. '15), of Kiel, Wis., has moved into his new home at 524 Broadway Street.

DR. J. C. KILE (O. S. U. '20), of London, Ohio, was quarantined with five of his children for scarlet fever recently.

DR. O. W. ORSON (Tex. '32), of Midland, Tex., is now connected with the Texas Live Stock Sanitary Commission, Fort Worth.

DR. W. F. ELLGEN (Iowa '33), formerly of Stewartville, Minn., has located at Ivanhoe, Minn., for general practice.

DR. CHING-SHENG LO (K. S. C. '23), of the Bureau of Agriculture and Forestry, Kwangtung, Canton, China, is now located in Soochow, China.

DR. EDWIN TEMPLE (McK. '11), of Tampico, Ill., has resumed his veterinary practice after serving as postmaster of Tampico for 13 years.

DR. R. A. GREGORY (K. C. V. C. '09), of Washington Grove, Md., was called to Iowa recently when his father was injured in an automobile accident.

DR. L. G. COMBS (Ind. '09), who is connected with the Health Department of the Canal Zone, has been transferred from Balboa to Ancon.

DR. C. J. KERSHAW (Mich. '30), formerly Superintendent of the Michigan Humane Society at Detroit, has entered private practice at Plymouth, Mich.

DR. C. L. LEE (Chi. '18), of Iola, Wis., has taken over the practice of the late Dr. Johannes Tonnessen, of Waupaca, Wis., who died on January 24, 1934.

DR. C. H. CABLE (Ont. '33) formerly associated with Dr. E. B. Dibbell (U. S. C. V. S. '21), of Baltimore, Md., located at Westminster, Md., recently for general practice.

DR. E. ZIEGENBUSCH (Cin. '12), of Delphos, Ohio, spent a month in Florida recently, according to a postal card mailed from Ocala. Mrs. Ziegenbusch accompanied him.

DR. S. E. HERSHEY (Q. U. '98), of Charleston, W. Va., was the subject of a biographical sketch published in the *Charleston Gazette* of February 2, on the occasion his birthday.

DR. J. R. CUNNINGHAM (Ont. '15-R. C. V. S. '21), of Summerside, Prince Edward Island, has been appointed to take charge of the laboratory of the Prince County Hospital.

DR. C. M. GRUBB (Geo. Wash. '11), of Rockville, Md., is reported to be up and around again, sufficiently recovered from his recent illness to be able to look after his practice.

DR. C. L. TOMPKINS (Chi. '12) has moved from Ivanhoe, Minn., to Redwood Falls, Minn., where he will operate a newly purchased farm and engage in general practice.

DR. F. D. PATTERSON (A. P. I. '21), formerly of the Department of Veterinary Research, Iowa State College, is now at Alabama Polytechnic Institute, where he is Professor of Animal Pathology.

DR. GLENN W. HORNER (U. P. '00), of Westminster, Md., recently left Mercy Hospital, Baltimore, where he had been a patient. He is reported to be making a satisfactory recovery from his illness.

DR. C. THIBEAULT (O. S. U. '29), formerly of 80 Lowell Place, Reading, Mass., announces a change of address to 16 Lowell Street, Wakefield, Mass., where he has established a new hospital and boarding kennels.

DR. P. E. JOHNSON (Chi. '14), of Britton, S. Dak., delivered a very entertaining talk on his trip to California, before the local high school students recently. Dr. Johnson is a member of the Britton School Board.

DR. C. E. HARROLLE (Chi. '17), of Olney, Ill., was injured while testing cattle near Pinckneyville recently. Several of the animals stampeded, and in the rush a piece of timber from a broken fence struck Dr. Harrolle on the neck.

DR. WILBERT SPEARMAN (Ont. '15), of Ottawa, Canada, was elected as Alderman for Rideau Ward, City of Ottawa, at the recent elections. Dr. Spearman is the youngest member of the City Council and the only veterinarian in that body.

DR. C. M. PRENTICE (O. S. U. '12), of Clyde, Ohio, escaped serious injury when his automobile collided with a Big Four train, on February 22. Dr. Prentice was making a professional call in a blinding snowstorm when the accident occurred.

DR. A. C. JERSTAD (Wash. '33) has accepted a position as pathologist for the Puritan Poultry Corporation located at Atascadero, Calif. This company has equipped a pathology laboratory on their poultry ranch which has a capacity for 50,000 laying hens.

DR. R. J. SCHOFFMAN (Iowa '30), who has been in general practice at Winnebago, Minn., for the past three years, has decided to enter the priesthood. He will take up his studies at the Monastery of the Sacred Heart, Hale's Corners, Wis., in the near future.

DR. WILLIAM M. HEAD (Chi. '12), of Walnut, Ill., received a broken arm while testing cattle for tuberculosis in Mercer County, Illinois, early in March. Dr. Head's arm was caught in such a position between a chute and a cow he was testing, as to cause a severe fracture.

DR. D. F. RICHARDSON (McK. '08), of Hoopeston, Ill., underwent an operation for the removal of kidney stones, on February 20. In his absence, his practice was handled by Dr. H. F. Jones (Chi. '20), of Alvin, Ill., who established a temporary office in Hoopeston for that purpose.

DR. J. P. WEST (McK. '07), of Madison, Wis., has been appointed Superintendent of Speed for the Wisconsin State Fair to be held in Madison, August 25-31, 1934. Dr. West, who has one of the largest racing stables in the state, has served in a similar capacity at the Fair for many years.

DR. JOHN KEPPEL (McK. '02), of Zeeland, Mich., has been appointed meat inspector by the Public Health Department of Grand Rapids, Mich., the first to hold this office under the new Abattoir Ordinance. Dr. Keppel was an inspector in the U. S. Bureau of Animal Industry for 20 years, having recently been retired.

DR. RAYMOND COULSON (Chi. '13), of Milwaukee, Wis., who is connected with the Milwaukee Department of Health, has received a second citation and medal for bravery in action during the World War. His second citation was made for rescuing wounded under fire. The medal is the silver star with the gold oak leaf cluster. He was given the medal of the Purple Heart a year ago.